Nio® medical display systems

Installation & User Manual

Supported displays: E-2620, E-3620, E-5620, E-2621, E-3621

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Copyright notice

Copyright notice

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Preface

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Notice

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FCC notice

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian notice

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

Disposal Information

The lamps inside the display contain mercury. Do not throw the display in the trash. Dispose of it as required by local ordinances or regulations.

Safety Instructions

General Recommendations

Read the safety and operating instructions before operating the display.

Retain safety and operating instructions for future reference.

Adhere to all warnings on the display and in the operating instructions manual.

Follow all instructions for operation and use.

Electrical shock

```
  /!\        CAUTION             /⚡\
        RISK OF ELECTRIC SHOCK
             DO NOT OPEN

      CAUTION: TO REDUCE THE RISK OF
     ELECTRIC SHOCK, DO NOT REMOVE
              COVER (OR BACK)
     NO USER-SERVICEABLE PARTS INSIDE
   REFER TO QUALIFIED SERVICE PERSONNEL
```
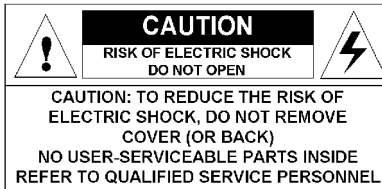
Type of protection (electrical):

Class I equipment

Degree of safety (flammable anesthetic mixture):

Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

Power connection

- Power requirements: The display must be powered using the 12 VDC power supply that is supplied with the display.

- The 12 VDC power supply must be powered by the AC mains voltage.

- Power cords:

  Power cord with CEE 7 plug: The colors of the mains lead are colored in accordance with the following code: Green-and-yellow: Earth (safety earth), Blue: Neutral, Brown: Line

  Power cord with ANSI 73.11 plug: The wires of the power cord are colored in accordance with the following code: Green/yellow: ground, White: neutral, Black: line (live)

- Do not overload wall outlets and extension cords as this may result in fire or electric shock.

- Mains lead protection (U.S.: Power cord): Power cords should be routed so that they are not likely to be walked upon or pinched by items placed upon or against them, paying particular attention to cords at plugs and receptacles.

Water and moisture

Never expose the display to rain or moisture.

Never use the display near water - e.g. near a bathtub, washbasin, swimming pool, kitchen sink, laundry tub or in a wet basement.

Ventilation

Do not cover or block the ventilation openings in the cover of the set. When installing the display in a cupboard or another closed location, heed the necessary space between the set and the sides of the cupboard.

Installation

Place the display on a flat, solid and stable surface that can bear the weight of at least 3 displays. If you use an unstable cart or stand, the display may fall, causing serious injury to a child or adult, and serious damage to the equipment.

More warnings in the Installation chapter.

Operating precautions

Continuous operation of the display with the same screen may result in some image sticking on the LCD panel.

Over 10 hours operation with the same image content is not recommended.

Switching on the display DPMS may decrease the risk of image sticking (image retention).

This apparatus conforms to:

CE (LVD 73/23/EEC), IEC 60950-1, UL 60950-1, CAN/CSA C22.2 No. 60950-1 (c-UL), EN 60950-1 DEMKO, CCC GB4943-1995

National Scandinavian Deviations for Cl. 1.7.2 :

Finland: "Laite on liitettävä suojamaadoituskoskettimilla varustettuun pistorasiaan"
Norway: "Apparatet må tilkoples jordet stikkontakt"
Sweden: "Apparaten skall anslutas till jordat uttag"

Explanation of symbols

Symbols on the display and power supply

On the display or power supply, you may find the following symbols:

Indicates the display is approved according to the CE regulations

Indicates the display is approved according to the UL regulations

Indicates the display is approved according to the c-UL regulations

Indicates the display is approved according to the DEMKO regulations

Indicates the display is approved according to the CCC regulations

Indicates the USB connectors on the display

Symbols used throughout the manual:

	Warning		Caution
	Important notice or remark		Note
	Hint, tip		Additional information

Overview

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Introduction

Thank you for choosing Barco.

Single display or complete system?

This manual describes installation and usage of a complete Nio system. A Nio system is a bundling of one or more displays and one or more display controllers.

However, if you have purchased the display only instead of a Nio system, please refer to the chapters in this manual covering the display, and disregard the information about the display controller or NioWatch software.

The displays

The E-2620 is a 19.8-inch grayscale LCD display with a native resolution of 1600 x 1200.

The E-2621 is a 21.3-inch grayscale LCD display with a native resolution of 1600 x 1200.

The E-3620 is a 20.8-inch grayscale LCD display with a native resolution of 2048 x 1536.

The E-3621 is a 21.3-inch grayscale LCD display with a native resolution of 2048 x 1536.

The E-5620 is a 20.1-inch grayscale LCD display with a native resolution of 2560 x 2048.

Their high-brightness, combined with image crispness and excellent viewing angle, makes them ideal for a multitude of medical applications and environments.

Long-term stabilization

The displays contain a Backlight Output Stabilization system (BLOS©), which continuously stabilizes the luminance output of the LCD's backlight. This improves the overall optical efficiency and provides long-term image confidence.

NioWatch

In Nio systems, the display comes standard with NioWatch, a user-friendly software tool that optimizes the LCD panel for DICOM-compliant viewing.

Power saving

The displays are equipped with a power saving system. When left idle for a certain time, the computer connected to the display, will power down the display.

The power saving system can be switched on or off using the on-screen menus.

Tilt & swivel base

The versatile tilt & swivel foot allows to use the display for viewing portrait or landscape image resolutions.

The user can easily change the panel height and viewing angle, allowing to use the display in the optimal viewing conditions.

BarcoMed Nio display controller overview

The BarcoMed Nio Display Controller delivers a quality image with 256 simultaneous shades of gray for medical viewing applications.

Minimum system requirements

- Pentium II 266 MHz with 128 MB RAM (Pentium II 800MHz with 256 MB RAM for cineloops)
- PCI slot with no obstructions
- PCI 2.1 and/or 2.2 Compliant
- Windows® XP Professional Service Pack 1or Windows® 2000 Professional Service Pack 4

Features of the BarcoMed Nio display controller

- Dual Head Configuration
- 8-bit in/10-bit out LUT
- 64MB Video Memory
- Portrait or Landscape Mode
- 256 Simultaneous shades of gray
- Hardware cursor
- 64bit/66Mhz Single slot PCI Card
- Displays VGA boot messages on BarcoMed Nio displays.

Supported resolutions for each head of the BarcoMed Nio display controller

For BarcoMed Nio 2MP

- 1200 x 1600 @ 60 HZ (primary)
- 1600 x 1200 @ 60 Hz

For BarcoMed Nio 3MP

- 1536 x 2048 @ 60 HZ (primary)

- 2048 x 1536 @ 60 Hz

For BarcoMed Nio 5MP

- 2048 x 2560 @ 60 HZ (primary)

- 2560 x 2048 @ 60 Hz

For all BarcoMed Nio display controllers

The following resolution is also available when the OS is booted in VGA mode.

- 640x480 @ Default Refresh Rate, 16 colors

System Configuration Guidelines

Because of the low power consumption and low heat generation of the BarcoMed Nio display controller, multiple controllers may be installed in adjacent PCI slots or adjacent to other PCI boards. Additionally there should be no need to modify either the PC's power supply and/or cooling system.

Package contents

Nio System package

Each Nio system contains one or more display boxes (see below) and a system accessory box containing the following items:

- Display controller(s)
- CD-ROM with driver, NioWatch software and documentation

Display box

Each display box includes one display and a display accessory box containing the following items:

- Plastic cover of the tilt & swivel foot
- Power supply
- Digital video (DVI) cable (25-pins)
- Two velcro strips to bind the cables
- European power cord
- American power cord
- Chinese power cord
- This manual
- Quick install card

If some of the items are missing, please contact the reseller from whom you have purchased the unit.

Parts, controls and connectors

Front
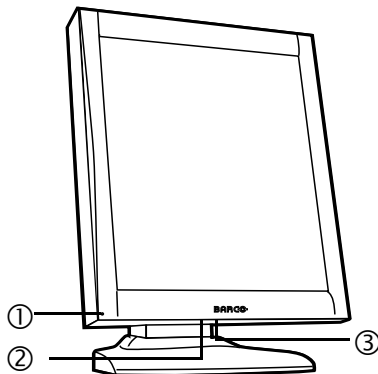
Figure 1: Front side

1. Power LED

   The LED is **off** when the display is disconnected from the power. The LED is also off when the LED function is disabled in the on-screen display (OSD).

   The LED is **green** when the display is on (when enabled in the on-screen menus).

   The LED is **orange** when the display is in Stand-by power-saving mode.

2. USB downstream port. See also item "7." on page 25

3. Control wheel

   The control wheel can be pressed like a push button and rotated like a knob.

   It allows to put the display in stand-by, navigate through the on-screen display (OSD) menus and change values in the OSD.

Rear
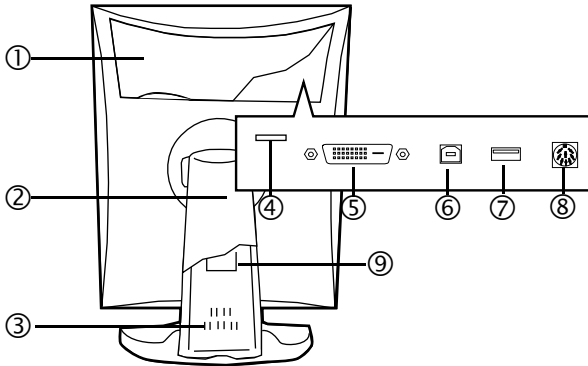
Figure 2: Rear side

1. Connector compartment cover

    To get access to the connectors, remove the cover by pulling down the 2 clips at the top of the cover.

2. Tilt & swivel foot cover

    This cover is packed in a separate box when the display is shipped to the customer.

3. Tilt & swivel foot

4. Slot for security cable (e.g., Kensington lock)

5. DVI (digital) video input

6. USB upstream port

    Connect this connector to the PC USB bus if you wish to connect USB devices to the display's USB downstream port.

7. USB downstream port

    When the display is connected to the PC USB bus, you can connect USB devices, such as keyboard, mouse, digital camera, to this connector.

8. DC power input

   Connect the external power supply, delivered with the display, to this connector.

9. Tilt & swivel foot clip

   The display is shipped with this clip in the foot to protect the tilt & swivel mechanism during transport. After unpacking, you should remove this clip.

   Do not throw the clip away! Should the display have to be packed and shipped later, the clip must be applied to the foot again.

Installation

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Installation precautions

Precautions

- Keep your original packaging. It is designed for this display and is the ideal protection during transport.

- Avoid reflections in the flat panel to reduce eye strain.

- Place the display on a strong and stable table or desk.

- Keep the display away from heat sources and provide enough ventilation around the display.

- Do not scratch or apply pressure to the LCD panel. This may damage the panel permanently.

Display controller installation

⚠ Caution: Wear a **grounded**, protective ESD strap during installation or handling of the display controller. Electrostatic charges can damage the display controller.

Prior to installing your BarcoMed Nio display controller(s) in your PC please take a few minutes to familiarize yourself with both the display controller(s) and the PCI slots in your computer.
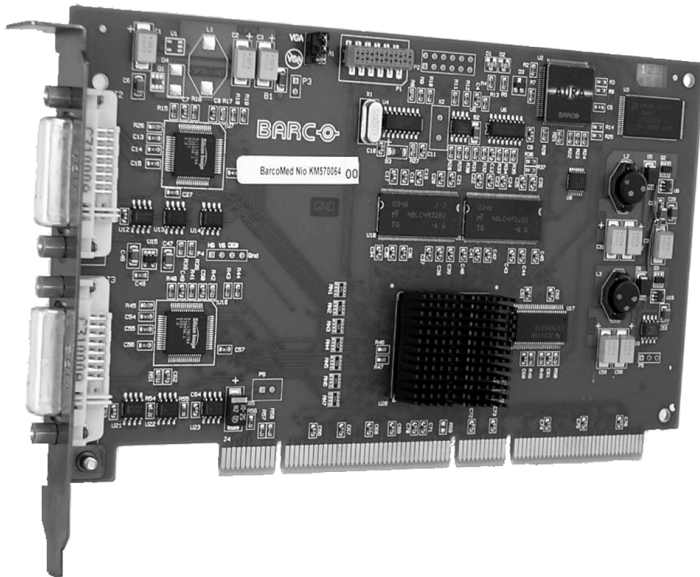

Figure 3: The BarcoMed Nio display controller

Using the VGA capabilities of the BarcoMed Nio display controller

Prior to installing the BarcoMed Nio controller, decide if you are going to use its on-board VGA capabilities. If you are, check the setting of the Jumper at J-1 on the display controller (see figure 4 on page 31). By default, VGA should be enabled, on the top two pins.
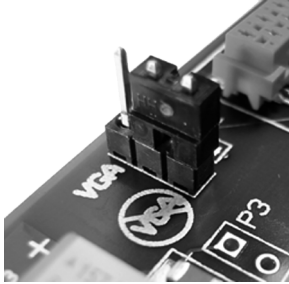
Figure 4

If you decide to use a separate VGA monitor as your boot monitor, you must disable the BarcoMed Nio's on-board VGA capabilities by moving the jumper to the bottom two pins.

Caution: To use multiple BarcoMed Nio controllers in a single host with VGA enabled, you should enable VGA on only ONE of the BarcoMed Nio display controllers and disable VGA on ALL the other BarcoMed Nio display controllers.

Examples of PCI slots

Although the BarcoMed Nio is a 64-bit board, it may be installed in either a 64-bit or 32-bit PCI slot. However, installing it in a 32-bit PCI slot will result in a decrease in performance. Figure 5 on page 32 illustrates the types of slots so that you can correctly identify which one to use for the BarcoMed Nio.
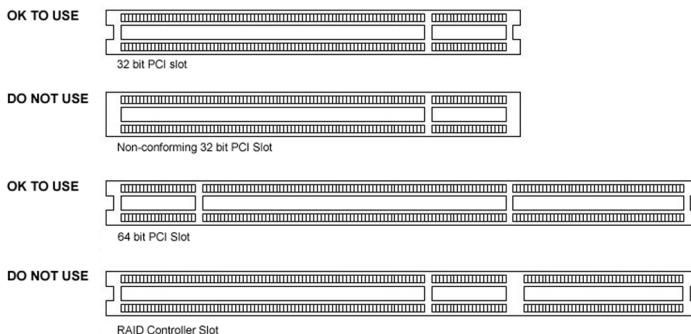
Figure 5: PCI and RAID Controller Slots

Installing the BarcoMed Nio display controller

Install the BarcoMed Nio controller in your computer following these steps:

1. Turn off the power to your computer and disconnect the power cord, however make sure that the computer chassis is **still grounded**.

2. Remove the chassis cover according to the manufacturer's instructions. Be sure to observe safety warnings.

3. If you have decided to use the on-board VGA capabilities of the BarcoMed Nio (see **Using the VGA capabilities of the BarcoMed Nio display controller** on page 30), you **must now remove** any VGA display controller(s) that are currently installed in the computer or **disable** any VGA controllers that are integrated into your PC's motherboard.

4. Install the BarcoMed Nio display controller into a free PCI slot, either 64-bit or 32-bit (see figure 5 above, for examples of slots). Be sure that the display controller is seated firmly in the slot.

5. Secure the card to the chassis with the PC's I/O panel mounting screw, and replace the chassis cover.

6. Connect the primary display to the connector marked "VID 1" on the BarcoMed Nio display controller using the provided DVI cable (see figure 6 below). For a dual-headed BarcoMed Nio setup, connect the secondary display to the other connector on the display controller.

7. Reconnect the power cord, turn on the power, and boot the system as usual.

Running multiple BarcoMed Nio Display Controllers in a single host

The physical order of the displays may vary when you are running multiple BarcoMed Nio display controllers. This is due to the PC's PCI bus control in the system BIOS, and not the BarcoMed display controller. It may become necessary, depending on how your PC's BIOS configures the PCI bus, to switch your DVI display connections to achieve a linear desktop configuration.

Figure 6

Display installation

After unpacking the display

⊙ **Important:**

In the factory, the height-positioning system in the display foot is blocked with a red clip to prevent damage during transportation.

Before installing the display, you must remove this clip.
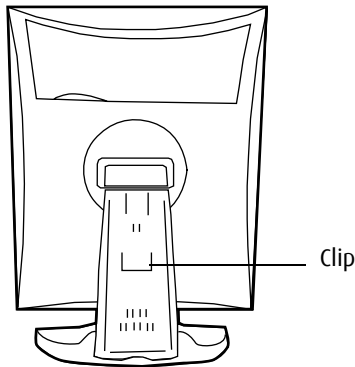
Figure 7

To remove the clip:

1. Position the display with its rear side facing you.

2. Pull the red clip out of the fixation holes in the foot.

3. Keep the clip in case the display needs to be shipped later.

Adjust the panel orientation

You can change the orientation of the panel at any time, but it is more convenient to select landscape or portrait orientation before connecting the cables.
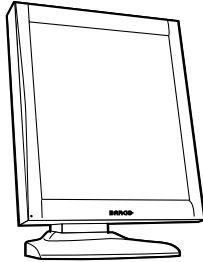
Figure 8:
Portrait
orientation
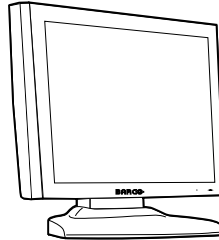
Figure 9:
Landscape
orientation

To change the panel orientation:

1. Stand at the front side of the panel and take the panel at both sides.

2. Very important: Tilt the panel before changing the orientation.

   Should you change the panel orientation without tilting it first, you might irreversibly damage the tilt & swivel mechanism.
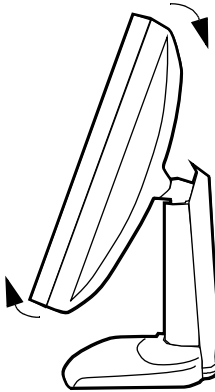
Figure 10: Tilt the panel before rotating

3. To change from portrait to landscape, turn the panel counterclockwise.
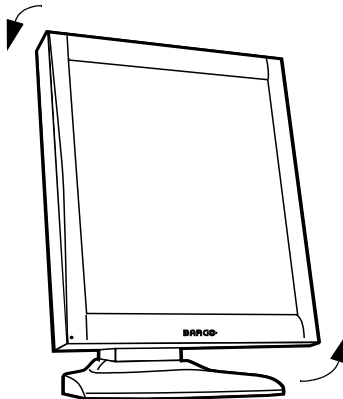
Figure 11: To rotate the panel from portrait to landscape

4. To change from landscape to portrait, turn clockwise.

Notice:

If, after installing the display or the system, you change the panel orientation while an image is on the screen, the result depends on your application:

- In a complete Nɪo system, the image orientation will adapt to the new panel orientation automatically after a second.

- If you would use the display without the Nɪo display controller board, the image orientation will not change with the panel orientation.

  To change the orientation of the image, you will have to change the resolution in the Windows Display control panel (if possible).

Power connection

To connect the power:
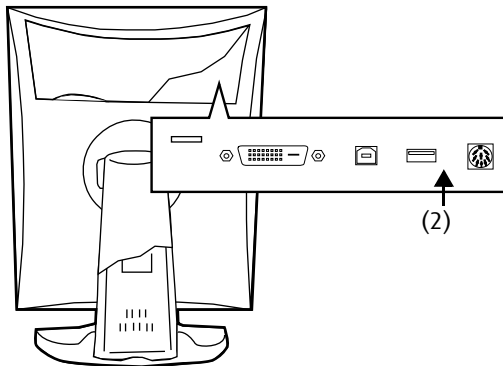
Figure 12
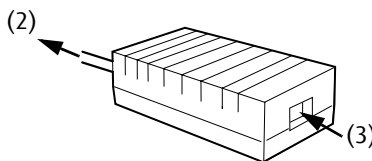
Figure 13

1. To get access to the connectors, remove the connector compartment cover by pulling down the 2 clips at the top of the cover.

2. Connect the output of the 12V DC power supply to the DC input of the display.

3. Connect one end of the proper power cable to the AC input of the 12V DC power supply.

4. Connect the other end of the power cord to a **grounded** power outlet.

Video connection

Connecting DVI cables: One display:
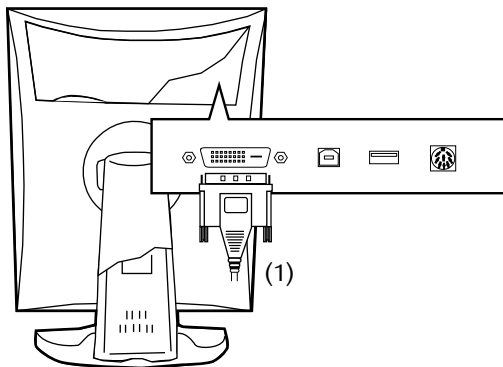
Figure 14

1. Connect one end of the DVI cable to the DVI input of the display.

2. Connect the other end of the DVI cable to the DVI connector of the display controller board. If this board has 2 video heads (2 video outputs), connect to output Vid 1 (Head A).

Connecting DVI cables: Two displays:

1. Connect the left display (when looking at the front side) to display controller output Vid 1 (Head A) as described above.

2. Connect the second display to output Vid 2 (Head B).

USB connection

The USB connection allows you to use the display as USB hub, to which you can connect USB devices, such as a keyboard, mouse or digital camera.

To connect the USB cable:
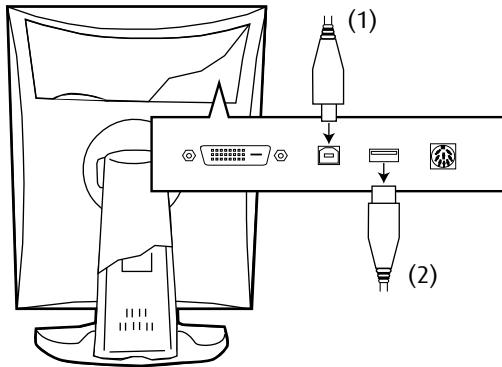
Figure 15

1. Connect a PC USB downstream connector to the display's USB upstream connector by means of a USB cable.

2. Connect any USB device to one of the display's USB downstream connectors.

Cable routing

Routing the signal cables

- Bind the cables in the connector compartment together with the cable tie inside the connector compartment.

- Put the connector compartment cover back on the display. Pay attention that the signal cables are positioned under the bulge in the cover.

- Push the cables into the clips on the rear of the tilt & swivel foot.

- Bind the cables together above and under the foot, by means of the 2 velcro strips attached to the inside of the foot cover (packed inside the accessory box).

- At last, put the foot cover back in place.

To put the foot cover in place:
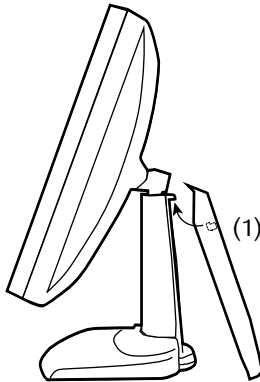
Figure 16

1. Push the upper side of the cover onto the foot, so that the hooks inside the cover are positioned right under the bulges at the rear of the foot.

2. Slide the cover upward while moving the lower side of the cover towards the foot.

3. Press the cover to the foot so that it makes a clicking sound.

Attaching the display to an arm stand

The panel, standard attached to the tilt & swivel foot, is compatible with the VESA 100 mm standard. So it can be used with an arm stand according to the VESA 100 mm standard.

Therefore, the tilt & swivel foot must be removed from the panel.

Important:

- Use an arm that is approved by VESA (according to the VESA 100 mm standard).

- Use an arm that can support a weight of at least 13 kg (28.66 lbs).

To attach the display to an arm stand:

1. Put the display face down on a clean surface. Be careful not to damage the panel screen.

2. Remove the tilt & swivel foot cover.

3. Remove the small screw (A) fixing the small plastic cover on top of the foot. Next, remove the small cover itself.
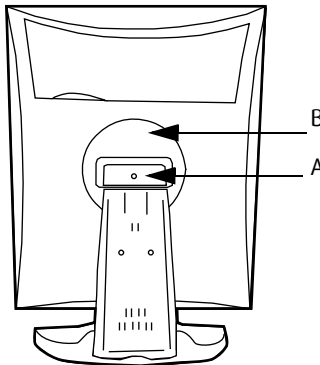
Figure 17: Display with tilt & swivel foot cover removed

4. Unscrew the 2 screws fixing the round plastic cover (B).

5. Lift up the round plastic cover.

6. Remove the four screws fixing the foot while supporting the foot.

7. Attach the arm stand **firmly** to the panel using 4 screws M4 x 8 mm.
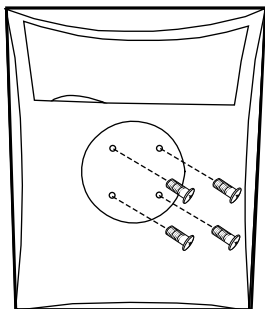
4 screws M4 x 8mm

Figure 18

Windows 2000 BarcoMed Nio software installation

☞ **Note:** These instructions apply to both **Windows**® **2000** and **Windows**® **XP**.

Preparation

Prior to installing your BARCOMED NIO software the following should be done.

1. Install the BarcoMed Nio display controller(s) in your system.

2. Connect the BARCOMED NIO display panel(s) to the BarcoMed Nio display controller(s) and power supply(s).

3. Decide if you want to install the NioWatch Software in addition to the driver.

4. Decide if you are going to install the BarcoMed Nio driver with DualView enabled or disabled) (see Step "7." on page 48 for a description of DualView).

5. Decide which Palette Mode you wish to use with the BarcoMed Nio display controller. If you are uncertain, use the default setting as this setting can be changed later using the BarcoMed Driver Tab of the Windows Display Properties control panel.

6. Put the BarcoMed Nio 2MP display panel in **landscape** position before installing the software. Put the BarcoMed Nio 3MP/5MP display panel in **portrait** position before installing the software. If you wish to change the panel orientation later, the image orientation will adapt automatically to the panel orientation **after rebooting the PC**.

☞ **Note:** Both displays connected to a single display controller must have the same physical orientation and resolution in order to be attached to the Windows desktop.

Using the BarcoMed product installation wizard

To install your BarcoMed Nio Windows display controller driver and NioWatch Software for the first time follow the steps below.

If you are reinstalling the drivers or installing a new driver release over an existing driver release skip to the step 5:

1. Boot your system, and log in using an account with administrator privileges.

2. For each BarcoMed Nio display controller installed in your system Windows will launch the "Found New Hardware Wizard". Click **"Cancel"**. Continue to click **"Cancel"** until Windows stops launching the "Found New Hardware Wizard". Please be patient as this may take several minutes while Windows scans its library of Plug-and-Play device drivers to see if it has a driver for your BarcoMed Nio controller.

3. If Windows advises you that it has finished installing all the new devices in your system and that you must reboot your system in order for the changes to take effect, click **"No"**.

4. Insert your BarcoMed Nio Software CD into your computer's CD drive. If the **"BarcoMed Product Installation Wizard"** doesn't start within one minute, browse the contents of your BarcoMed Nio Software CD and double click on the file: **"Setup.exe"** to start the wizard.

   The BarcoMed Product Installation Wizard will begin by inspecting your system to make certain that all of the Windows components it needs are up to date. If they are, the BarcoMed Product Installation Wizard will display the BarcoMed Product Installation Wizard's welcome screen (see figure 19 on page 45). If the screen shown in figure 19 appears, please skip to step "5." on page 46, otherwise continue to the next page.
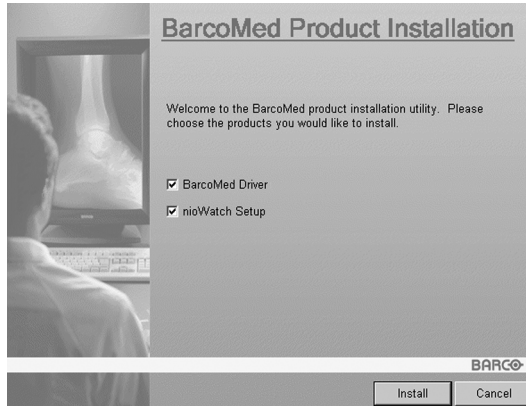
Figure 19

If it determines that the Microsoft Installer is either out of date or missing, it will display the screen shown in figure 20 below. Click **"OK"** to continue, the wizard will then install a newer version of the Microsoft Installer.

Figure 20

The BarcoMed Product Installation Wizard will advise you when it has successfully installed the new version of the Microsoft Installer. Click **"OK"**.

The Wizard may prompt you to restart your system. If it does, click **"Yes"** to restart your system now.

When your system restarts log in using an account with administrator privileges. Windows will again launch the "Found New Hardware Wizard" for each BarcoMed Nio it finds in your system. Click **"Cancel"**. Continue to click **"Cancel"** until Windows stops launching the "Found New

Hardware Wizard - Video Controller". Again, please be patient as Windows will again scan its library of Plug-and-Play device drivers to see if it has a driver for your BarcoMed Nio controller.

The BarcoMed Software Install Wizard will automatically restart and the BarcoMed Product Installation Wizard's welcome screen will again be displayed (figure 21 below).

5. By default all the software on the BarcoMed Software CD will be selected. For the initial installation we recommend that you install all of the software. If you do not want to install a particular BarcoMed Software product at this time, deselect it by clearing the checkbox next to it. Click **"Install"** to continue or **"Cancel"** to exit the wizard.

Figure 21

Driver installation

6. Click **"Next"** on the Display Driver Wizard's Welcome Screen to continue or **"Cancel"** to exit the Display Driver Wizard and return to the Software Install Wizard.

The Device Selection Screen's dialog box (figure 22 on page 47) should show only those devices physically installed and supported by the BarcoMed display controller driver on

your BarcoMed Software CD. Select the **device** you want to install and then click **"Next"**.

(i) **Note:** If there are no BarcoMed devices installed, or if Windows does not recognize the installed devices, or if the driver on your BarcoMed Software CD does not support the installed devices, the dialog box will be empty[1], and the BarcoMed driver wizard will exit when you click **"Finish"** or **"Cancel"**.

Figure 22: Sample device selection screen, the device shown in your system may be different.

⚠ **Caution:** You can install the driver for only one type of BarcoMed device at a time. If you have multiple types of BarcoMed devices installed in your computer, you will need to rerun the installer to install the drivers for the other devices.

If you select a device with an installed driver, the wizard will warn you if the installed driver is newer than the one you are installing (see figure 23 on page 48).

---

1. If Windows does not recognize the installed BarcoMed device, special settings may need to be made in the BIOS to support non-AGP video controllers or to support multiple video controllers. Check with your PC manufacturer.
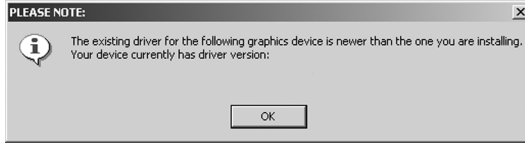
Figure 23

Click **"OK"** to install the new driver. If you don't want to replace the exiting driver, click **"OK"** and then click **"Cancel"**.

7. Your selection on the "Enable DualView" screen (figure 24 below) determines if DualView is enabled or not. DualView allows a dual head display controller to display two separate desktops, one for each display instead of a single virtual desktop that spans across both displays.
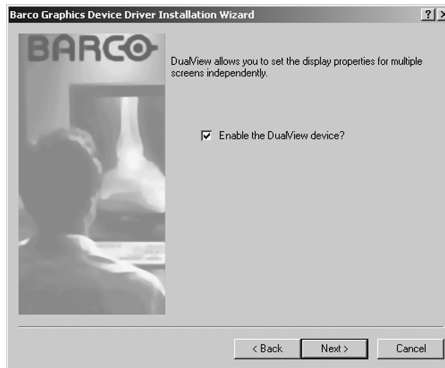
Figure 24

The difference between running with DualView enabled or disabled is shown in figures 25 and 26 on page 49. If you wish to enable DualView "check" the checkbox next to "Enable the DualView device?", and click **"Next"**. If you do not wish to enable DualView "clear" the checkbox next to "Enable the DualView device?", and click **"Next"** to continue.
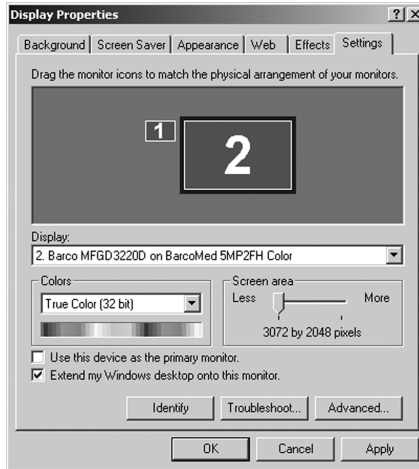
Figure 25: DualView Disabled–Rectangle 2 represents the combined heads of the BarcoMed Controller.
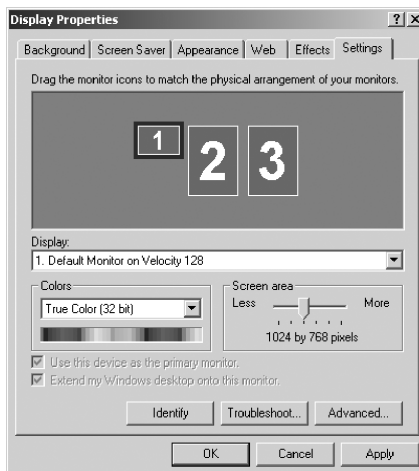
Figure 26: DualView Enabled–Rectangles 2 & 3 represents the individual heads of the BarcoMed Controller.

Special Note: If you installed the drivers with DualView disabled, Windows will still show two devices installed for each BarcoMed Display Controller installed under "Display

Adapters" in the "Device Manager Control Panel". The second device will be disabled. This is normal. Do **NOT** try to enable any of the disabled display adapters.

8. The "Device Confirmation" screen displays the device driver that will be installed and if DualView will be enabled or not. If you want to change your selection, click **"Back"** to return to the Device Selection Screen. Click **"Next"** to begin installing the driver. Click **"Cancel"** to abort the driver installation.

⚠ **Caution:** Once you click **"Next"**, you cannot cancel the driver installation.

Prior to beginning the installation the BarcoMed Driver Install Wizard will warn you that while the driver is being installed your display may flicker. Click **"OK"** to continue.

9. When the screen shown in figure 27 below and figure 28 on page 51 appears, click **"Yes"** or **"Continue Anyway"** to continue. This screen may appear multiple times.

Figure 27: Windows 2000 Digital Signature Not Found Warning

Figure 28: Windows XP Windows Logo Testing Warning

10. When the screen shown in figure 29 below appears select the palette mode which is the correct one for your viewing application. If you are uncertain use the default settings. You can change the palette mode later (See **"Palette Mode"** on page 66 of the BarcoMed Driver Tab section). If you want to enable DirectDraw check the **checkbox** next to "Enable Direct Draw".
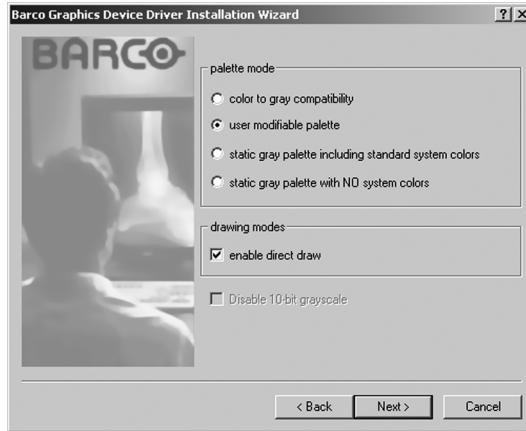
Figure 29

When the Driver Install Wizard tells you that it has successfully installed the selected driver, click **"Finish"**.

The wizard will now begin installing the next selected piece of BarcoMed Software. If you are working with the default selections, this will be the Barco NioWatch. Please turn to the section, **"BarcoMed NioWatch installation"** below.

If the installation of the products you selected at the beginning is complete, click **"Finish"** to exit the BarcoMed Product Install Wizard or click **"Back"** to return to the Welcome Screen of the BarcoMed Product Install Wizard to select additional software to install. When you click **"Finish"** Windows may prompt you to restart your system, if it does click **"Yes"**. When your system restarts, boot normally and log in using an account with administrator privileges and turn to the section **"Barco monitor plug and play software"** on page 54.

Note: Clicking **"Cancel"** will also return you to the BarcoMed Product Install Wizard, but will not delete the Barco display

driver. The wizard will also begin to install the next selected piece of BarcoMed Software.

If the Wizard *failed* to successfully install the selected driver, it will warn you that the installation failed. Click **"Finish"** to return to the BarcoMed Product Install Wizard. The wizard will now begin installing the next selected piece of BarcoMed Software. Click **"Cancel"**, then click **"Yes"** then click **"Finish".** Now **"Back"** and try reinstalling the driver following the steps above or using the steps outlined in the section **"Reinstalling or updating your BarcoMed 2MP2CP driver"** on page 107.

BarcoMed NioWatch installation

1. Click **"Next"** on the Welcome Screen of the BARCO NioWatch InstallShield Wizard (figure 30) to begin the installation or click **"Cancel"** to cancel and return to the BarcoMed Product Install Wizard.

2. After reading the Software License Agreement on the next screen, click **"Yes"** to continue.

3. Click **"Next"** on the Choose Destination Location screen to install the NioWatch software in the default location. Or click **"Browse"** to install the software in a different location.

Figure 30

4. Click **"Next"** on the Select Program Folder screen to install the NioWatch software in the default location. Or select one of the folders in the Existing Folders dialog window.

   While the wizard is installing NioWatch, it will display a Setup Status screen.

5. When the Wizard has finished installing the NioWatch software it will ask you if you want to read the Release Notes now. Click **"Yes"** or **"No"** to continue.

6. When the InstallShield Wizard Complete Screen appears click **"Finish"**.

7. Click **"Finish"** on the BarcoMed Product Installation screen to complete the install process.

If the installation of the products you selected at the beginning is complete, click **"Finish"** to exit the BarcoMed Product Install Wizard or click **"Back"** to return to the Welcome Screen of the BarcoMed Product Install Wizard to select additional software to install. When you click **"Finish"** Windows may prompt you to restart your system, if it does click **"Yes"**.

When your system restarts, boot normally and log in using an account with administrator privileges and turn to the section **"Barco monitor plug and play software"**.

Barco monitor plug and play software

After your system restarts and you have logged in, Windows will install the Barco Monitor Plug-n-Play software. If Windows displays the screens shown in figure 31 below and figure 32 on page 55, click **"Yes"** or **"Continue Anyway"** to continue.
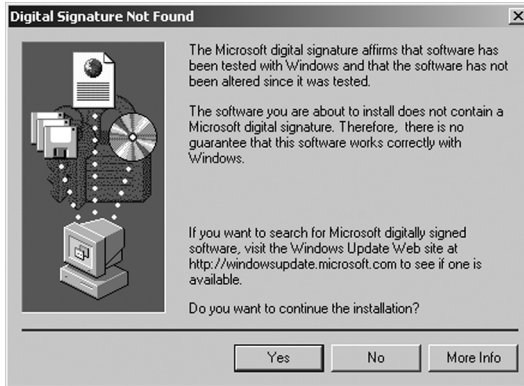
Figure 31: Windows 2000 Digital Signature Not Found Warning

Figure 32: Windows XP Windows Logo Testing Warning

The Barco Monitor Plug and Play software should automatically set the resolution for the displays of your BarcoMed Nio System. It may be necessary to reboot the system a second time if the window on the Barco display is not running in the same orientation as the display. For example the display is in portrait orientation, but the window appears in landscape orientation. However, the second head of a dual headed system may be inactive. To make this display active you must extend your desktop to these displays using the **"Windows Display Control**

Panel". If for some reason Windows failed to correctly set the resolution of your displays please turn to the section **"Setting the resolution of your BARCOMED NIO display"** on page 117 of the Troubleshooting Section of this manual for instructions on setting the resolution.

NioWatch

BarcoMed NioWatch installation

1. Click **"Next"** on the Welcome Screen of the BARCO NioWatch InstallShield Wizard (figure 33) to begin the installation or click **"Cancel"** to cancel and return to the BarcoMed Product Install Wizard.

2. After reading the Software License Agreement on the next screen, click **"Yes"** to continue.

3. Click **"Next"** on the Choose Destination Location screen to install the **NioWatch** software in the default location. Or click **"Browse"** to install the software in a different location.
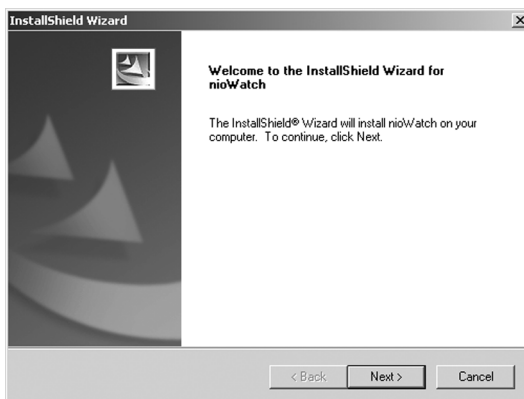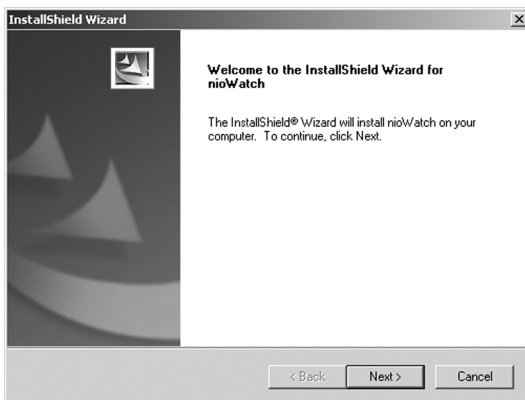

Figure 33

4. Click **"Next"** on the Select Program Folder screen to install the **NioWatch** software in the default location. Or select one of the folders in the Existing Folders dialog window.

   While the wizard is installing NioWatch, it will display a Setup Status screen.

5. When the Wizard has finished installing the NioWatch software it will ask you if you want to read the Release Notes now. Click **"Yes"** or **"No"** to continue.

6. When the InstallShield Wizard Complete Screen appears click **"Finish"**.

7. Click **"Finish"** on the BarcoMed Product Installation screen to complete the install process.

Note: Silent mode installation

You can install NioWatch in silent mode on a system where no previous version of NioWatch is installed.

Silent mode means that no user intervention is required during installation.

To install NioWatch in silent mode:

1. Open the command prompt (DOS window) in Windows.

2. Using DOS commands, navigate to the folder containing the NioWatch setup.exe file on the CD-ROM.

3. Type: "setup.exe_/s_/v/qn" (where "_" represents a space)

Barco LCD sensor installation

In case you will be using the Barco LCD sensor with your system, you may have to install its driver.

The Barco LCD sensor is a USB device. Connect the sensor to a free USB downstream connector.

When you connect the sensor for the first time, the "New hardware found" wizard starts.

In that case, locate the appropriate driver file (.inf file) on the NioWatch CD-ROM in the folder "BarcoLCDSensor".

Display Controller settings

(This page intentionally left blank.)

Barco Display Tab

Introduction

The Barco Display Tab is used for gathering information about the BarcoMed Flat Panel Display(s).

To access the Barco Display Tab do the following:

1. Open the "Display Properties Control Panel" by right clicking on the **desktop**, then select **"Properties"**.

2. Under Windows 2000 and Windows XP, click on the "**Settings"** tab. Double click on the rectangle that represents the BarcoMed Display you are working with to bring up its properties page. Click on the **"BARCO Display"** tab (figure 34 below).
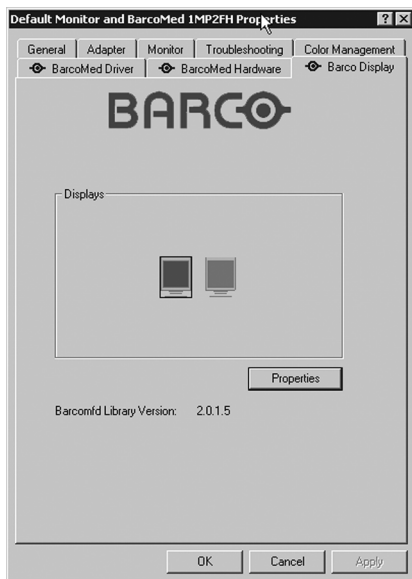
Figure 34: BARCO Display Tab under Windows 2000 and Windows XP

Using the Barco Display Tab

Displays

All of the available display adapters that are of the same type as the current barco display adapter are shown here graphically, with one display icon representing each port of a display adapter. The icon orientation reflects the display resolution. Only those ports with a display attached to them are active. If an icon is grayed out, that indicates a port with no head attached to it. When running DualView under Windows 2000 and Windows XP the desktop *must* be extended to include each display, otherwise those ports will not be visible to the Barco Display Tab.

Hovering the cursor over a display icon will pop up a window with information that identifies the display.

Properties

You may access the Properties page of the currently selected display, which is represented by the monitor icon above with the black frame around it, by either clicking on the **"Properties"** button or double clicking on the **icon**.

BarcoMFD library

This is the version of the barcomfd library currently used. This library provides APIs for interacting with the displays.

Nio Display Properties

You may access the Properties page of the currently selected display, which is represented by the monitor icon above with the black frame around it, by either clicking on the **"Properties"** button or double clicking on the **icon**. This screen (figure 35 on page 63) shows properties of the currently active display.

Name: Displays the model name of the display.

Serial Number: Displays the serial number of the display.

Backlight RunTime: This is time in hours that the back light has been on. A common question is: How much longer will the backlight last? The backlight will typically last a very long time, but will only be able to hold a calibrated output of for 17000 hours, after which time it will become slowly dimmer. For displays calibrated at, an estimate of how long it will be before a backlight replacement is needed = 17000 hours – backlight age.

Firmware Revisions: This is the runtime firmware that is loaded in the display. This information may be helpful when there is a problem.

Internal Temperature: This is the temperature inside the display. It starts out at about the ambient temperature when the display backlight is first turned on, then rises slowly to a steady-state temperature as the display warms up. Changes in light level due to temperature variations are completely controlled by the I-Guard sensor on the front of the display.

Current Luminance Value: This is the current luminance value of the display. It may vary a bit from time to time, for the display continuously calibrates itself to meet the target luminance value.
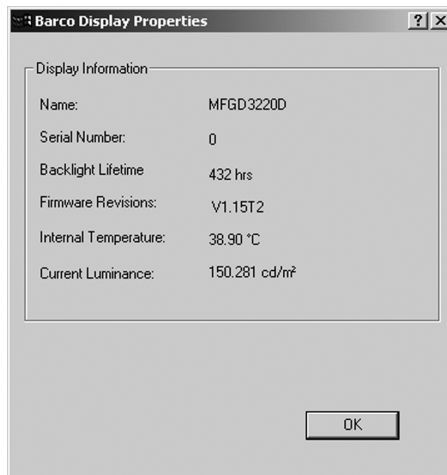
Figure 35

BarcoMed Driver Tab

Introduction

After the BarcoMed Windows display controller driver is installed, a new Display Properties tab is available for configuring special features of the BarcoMed display controller.

Languages supported

The BarcoMed Driver Tab supports the following languages:

English (U.S) (default)
Dutch
German
Korean
Japanese
Simplified Chinese
Traditional Chinese

To change between the languages select the correct region via the Regional Settings Control Panel in your machine's Start > Settings > Control Panel.

Using the BarcoMed Driver Tab

Please note that you must have logged on to Windows using an account with administrator privileges in order to use the BarcoMed Tabs of the Windows Display Control Panel to change any display settings.

1. Open the "Display Properties Control Panel" by right clicking on the desktop, then select **"Properties"**.

2. Under Windows 2000 or Windows XP, click on **"Settings"** tab. Double click on the **rectangle** that represents the Barco display whose settings you wish to change to bring up its property page. Click on the "BarcoMed Driver" tab (see figure 36 on page 65).

Figure 36: BarcoMed Driver Tab under Windows 2000 and
Windows XP

Status

The Status section displays information about the current
BarcoMed display controller, driver, and the currently selected
display resolution.

Graphics Board

This displays the current BarcoMed display controller.

Driver Version

This displays the current BarcoMed driver version.

Resolution

This displays the currently selected display resolution.

Palette Mode

In the Palette Mode section you can choose one of the four following Palette Modes.If you are using a color display in conjunction with your Barco grayscale display(s) under Windows 2000 or Windows XP, prior to selecting a palette mode please make certain that you have configured your Window 2000 or Windows XP desktop correctly. (See the section **"Configuring the Windows 2000 or Windows XP desktop"** on page 70.)

Color to Gray Compatibility

Use this palette option for applications, such as Java, which require True Color support. Such applications may not work correctly when using one of Barco's three "Standard 8-bit (256-color)" palette modes. All applications that are designed to work correctly with 8-bit (256-color) modes should continue to work normally.

Please note that dithering is not used while in this mode. The Enable Dithering check box will be grayed-out, and dithering will be automatically disabled regardless of whether this check box is checked. This complies with the Windows standard interface method.

Also, please note that direct access to the hardware through DirectDraw is not allowed in this mode. The Enable DirectDraw check box will be grayed-out, and DirectDraw's access to the hardware will be automatically disabled regardless of whether this check box is checked. DirectDraw is still usable through DirectDraw's Hardware Emulation Layer.

UserModifiable Color Palette

This option allows applications to modify the palette contents dynamically. As indicated in figure 37 on page 67, this mode reserves the first 10 and last 10 entries in the palette for the

Windows operating system, but applications can manipulate the middle 236 entries. This is the standard palette mode as configured by Windows.
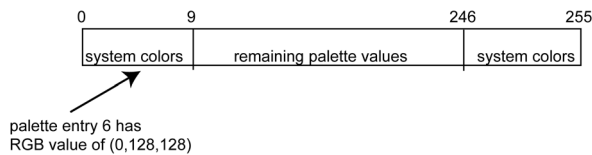
Figure 37

Static Gray Palette including standard system colors

This option sets the palette to be a static set of 256 gray values. Therefore, applications are denied the ability to dynamically change or allocate palette entries. This prevents palette conflicts between applications, which can cause image color values to appear distorted in the background application.

As shown in figure 38, the 20 standard system colors are converted from RGB to gray values. The rest of the 236 entries from index 10 to 245 contain the missing gray values so that the palette has the full 256 gray values within it.
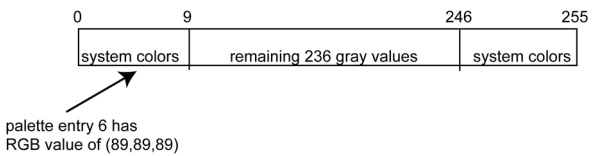
Figure 38

Please note that dithering is not permitted while in this mode. The Enable Dithering check box will be grayed-out, and dithering will be automatically disabled regardless of whether this check box is checked. This complies with the Windows standard interface method. If you are unsure whether or not your application requires this "Static Gray Palette including Standard System Colors" mode, contact your application provider.

Static Gray Palette with NO system colors

This option sets the palette to be a static linear ramp of 256 shades of gray. Therefore, applications are denied the ability to dynamically change or allocate palette entries. This prevents palette conflicts between applications, which can cause image color values to appear distorted in the background application.

As shown in figure 39, each of the 256 entries in the palette has an RGB value of (i, i, i) where i is the index from 0 to 255.

```
                        palette entry 110 has RGB
                        value of (110,110,110)
0                              ↙                              255
  ┌──────────────────────┬──────────────────────────────────┐
  │                      │                                    │
  └──────────────────────┴──────────────────────────────────┘
```
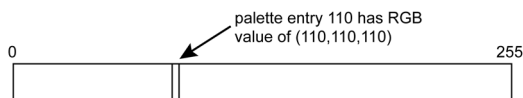
Figure 39

If you wish to use a static gray palette we recommend using the "Static Gray Palette including Standard System Colors" option instead of this one. This is due to the fact that some applications assume that the first and last 10 entries of the palette are the standard system colors. In this palette mode, these entries are made up from entries in the bottom or the top of the gray ramp. Please note that dithering is not permitted while in this mode. The Enable Dithering check box will be grayed-out, and dithering will be automatically disabled regardless of whether this check box is checked. This complies with the Windows standard interface method. If you are unsure whether or not your application requires this "Static Gray Palette with NO System colors" mode, contact your application provider.

Drawing Modes

In the Drawing Mode section you can choose from the following Drawing Modes. If any of the options in this section are grayed out, then they are not available for the model controller with which you are working.

Enable DirectDraw

This option allows the user to enable or disable DirectDraw. DirectDraw is a software interface that provides direct access to display devices while maintaining compatibility with the Windows graphics device interface (GDI). DirectDraw provides a device-independent way for applications to gain access to the hardware features of specific display devices. If you enable DirectDraw, your application will have the choice of using DirectDraw or GDI. If you disable DirectDraw, your application will use GDI instead of DirectDraw. Please note that in any case, your application can always use BarcoMed driver functions (i.e. WinBarco) or other graphics extensions (such as OpenGL).

Monitor Configuration

If the options in this section are grayed out, then they are not available for the model controller with which you are working.

Under Windows 2000 and Windows XP you can **enable** or **disable** DualView through the drop-down menu.

In SingleView mode the Monitor Configuration section allows you to select the number of monitors that the current display boards should drive, as well as how the monitors should be positioned. **For example**, if the current board installation is capable of driving four heads, but you only have three monitors which are placed in a single row, then you can select the "Three monitors–one row" option from the pull-down list. This would cause the Windows virtual desktop to be resized to fit on the three monitors, and you can move your cursor horizontally from one screen to the other. If "Custom Configuration" is displayed, it means that the current monitor configuration was set via the registry and it doesn't agree with any of the configurations that the display control panel supports. Contact Barco Medical Imaging Systems for further information.

Configuring the Windows 2000 or Windows XP desktop

Important: If you are using a color display in conjunction with your Barco grayscale display(s) you should configure your desktop before setting the resolution of the your Barco grayscale display(s).

Under Windows 2000 or Windows XP the recommended configuration for best grayscale image quality when using a color display in conjunction with your high-resolution grayscale display(s) is to set the *color display* as the **primary** monitor. Then set the colors setting on the "Settings" tab of the Windows Display Control Panel to the highest possible color depth (e.g. 32 bits-per-pixel "true color") supported by the color display's controller.

The colors setting for your high-resolution grayscale displays should default to 256 colors (8 bits per pixel). The **palette mode** for the your high-resolution grayscale displays should be set to *Static Gray palette with NO system colors*. This guarantees that the all of the 256 gray levels available for GDI graphics will be present, and also eliminates the danger that colors will change when focus moves among different applications.

However, if you are using the *Color to Gray Compatibility* palette mode, the color setting for your high-resolution grayscale displays should default to True Color (32 bits per pixel). Even though this palette mode supports 32 bit True Color, we recommend that when using a using a color display in conjunction with your high-resolution grayscale display(s) that you still set the *color display* as the **primary** monitor.

Configuring the DualView desktop

Display Resolution

Under Windows 2000 and Windows XP both displays connected to a single BarcoMed controller must have the same resolution settings in order to be attached to the desktop.

Examples (your resolution settings may be different):

OK to use:

> Display 1 2480 x 2560 @ 59 Hz
> Display 2 2480 x 2560 @ 59 Hz

Not OK to use

> Display 1 2480 x 2560 @ 59 Hz
> Display 2 2560 x 2480 @ 59 Hz

The following options maybe set individually on each Barco display even if they are connected to the same BarcoMed controller:

> Palette Mode
> Drawing Mode

Note: If the second display connected to any given BarcoMed controller is not attached to the desktop when you set the Palette Mode, Drawing Mode, etc. of the attached display, the second display will inherit the properties of the first display when you attach it to the desktop.

BarcoMed Hardware Tab

Introduction

The BarcoMed Hardware Tab is used for gathering information about BarcoMed display controller(s). For all BarcoMed display controller(s) it will display PCI information. For BarcoMed display controller(s) based on the AURA video chipset it will also display information about the Firmware installed on the board.

Table 1:

AURA Controllers	Non-AURA Controllers	BarcoMed Hardware Tab Support
BarcoMed Nio		PCI and Firmware Information
BarcoMed Coronis		PCI and Firmware Information
BarcoMed 1MP2FH		PCI and Firmware Information
	BarcoMed 2MP1	PCI Information Only
	BarcoMed 2MP1NT	PCI Information Only
	BarcoMed 2MP2	PCI Information Only
BarcoMed 2MP2H		PCI and Firmware Information
	BarcoMed 2MP2CF–3D	PC and Firmware Information
	BarcoMed 2MP2CP	PCI and Firmware Information
BarcoMed 2MP2FH		PCI and Firmware Information

Table 1:

AURA Controllers	Non-AURA Controllers	BarcoMed Hardware Tab Support
BarcoMed 3MP2FH		PCI and Firmware Information
	BarcoMed 5MP1H	PCI Information Only
BarcoMed 5MP1HM		PCI and Firmware Information
	BarcoMed 5MP2	PCI Information Only
BarcoMed 5MP2 AURA		PCI and Firmware Information
BarcoMed Coronis 5MP		PCI and Firmware Information
BarcoMed 5MP2F		PCI and Firmware Information
BarcoMed 5MP2FH		PCI and Firmware Information

Using The BarcoMed Hardware Tab

To access the BarcoMed Hardware Tab do the following:

1. Open the "Display Properties Control Panel" by right clicking on the **desktop**, then select **"Properties"**.

Figure 40 BarcoMed Hardware Tab under Windows 2000 or
Windows XP

Device

Displays the current BarcoMed display controller, driver, and the
currently selected display resolution.

Identify Device: This button is for BarcoView Medical Imaging
Systems (MIS) internal use only and is grayed out.

PCI Information

Device ID: Displays the device's PCI Device ID number.

Vendor ID: Displays the device manufacturer's PCI Vendor ID number.

Subsystem ID: Displays the device's PCI Subsystem ID number.

SubsystemVendorID: Displays the device's PCI Subsystem Vendor ID number.

VGA Status: Displays whether the VGA capabilities of the BarcoMed controller are enabled or disabled.

Firmware Information

Product Name: Displays the name of the BarcoMed display controller installed in the selected PCI slot.

Serial Number: Displays the serial number of the BarcoMed display controller installed in the selected PCI slot.

VGA Bios Version: Displays the VGA Bios version for the BarcoMed display controller installed in the selected PCI slot.

Firmware Version: Displays the firmware version for the BarcoMed display controller installed in the selected PCI slot.

Hardware Version: Displays the Hardware Version for the BarcoMed display controller installed in the selected PCI slot.

"Advanced ..." Button: By clicking on this button, the user can display more information about the BarcoMed display controller installed in the selected PCI slot.

Utilities

"Generate Report" Button:

Clicking this button will launch the BarcoMed Self Exam utility. BarcoMed Self Exam is an automated Barco Diagnostic Tool that is used to gather the information that support engineers and technicians need to help determine the root cause of a customer

problem. It probes the system for various types of system information, and saves it to a web-page report that can then be analyzed by the Barco ImageCare team.

BarcoMed Self Exam is implemented in a Wizard Format. The BarcoMed Self Exam Wizard will first ask the user to provide detailed customer contact information. After completion of the customer contact information screen, the Wizard will then ask the user to provide a description of the problem, and prompt the user to enter the Medical Viewing Applications that they are using. The Wizard will then automatically collect the diagnostic information from the user's system. When completed, the Wizard will alert the user of completion and open the report. The report is saved in an HTML format file on the user's desktop.

Welcome Screen

The Welcome screen reminds the user to close all applications before starting the wizard. The screens that follow guide the user through gathering pertinent diagnostic data that will help in determining the root of the problem.

Customer Information Screen

All fields on this screen **must** be filled in. This screen asks the user for contact information that will help the Barco support team contact the customer. The user will not be allowed to move forward to the next screen unless all of the fields are filled in.

Customer Diagnostic Questions Screen

This screen allows the user to tell the Barco ImageCare team as much as possible about the problem. For the Medical Viewing Applications Running field, enter the medical applications that are currently running on the system with the problem. For the "Any Applications using DIMPL" question, select the **"radio button"** that applies to the correct response. For the "Detailed Description" field, **enter a detailed description of the problem**. And, for the Additional Notes field, enter any information that could help the Barco ImageCare team diagnose the problem.

Gathering Diagnostic Data Screen

⊘ **Important:** When performing the Graphics Operations, you must drag the **"Gathering Diagnostic Data Screen"** onto the display for which you want the Graphics Operations data.

This screen gathers the diagnostic data from the user's system as described above in this document. Click the **"Start Diagnostic"** button to begin the diagnostic gathering process.

To perform the graphics operations test, check the graphics operations checkbox. During the graphics operations test, several things will happen to the screen. Each graphics operation is performed for 10 seconds. To quit the graphics operations test at any time, press the Escape button.

To create a summary report for QA purposes, check the summary report checkbox. If this box is checked, an additional report will be saved on the desktop called BarcoExamSummary.txt.

Please let the wizard gather all of the data, the **"NEXT"** button will be enabled only after all of the information is gathered. Once the information is gathered, the user may <u>not</u> go back in the wizard screens.

Completion Screen

The BarcoMed Self Exam has collected all of the information. A report called BarcoSelfExam.html exists on the desktop with all of the diagnostic data that was collected. If a summary report was created, it exists on the desktop called BarcoExamSummary.txt.

☞ **Note:** The absolute path to the location of the BarcoMed Self Exam reports is:
under Windows 2000 and Windows XP

   C:\Documents and Settings\<username>\Desktop

Submitting the Data to Barco Support

Once BarcoMed Self Exam has collected the data, the user can submit it to ImageCare, Barco Medical Imaging Systems'

customer support organization by email. To do this you need a system with access to the World Wide Web.

1. Enter the following address in your Web browser's address bar: http://www.barco.com/medical/

2. In the left hand column click on **"Contact us"**

3. Then click on "**Support"** in the drop down menu.

4. Find the appropriate ImageCare Center for your country and click on the **email link**.

5. Enter a **subject and a brief message** describing the problem about which you are requesting help.

6. Attach the **BarcoMed Self Exam report(s)** to the email message and send it.

You will receive an acknowledgment of receipt of your email by the end of the next business day.

Update Device... Button:

Clicking this button will launch the BarcoMed Hardware Configuration utility. This program allows the user to flash update the firmware stored in the ROM of the currently selected BarcoMed display controller. The BarcoMed Hardware

Configuration utility is implemented in a Wizard format, which guides the user through the flash update procedure. The user will be prompted to select a firmware update file to use for the update process. This file will be provided by BarcoView MIS if and when a firmware update is required.

NioWatch operation

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To use NioWatch

The NioWatch application resides in the Windows systray. To use one of the NioWatch functions, right-click on the NioWatch systray icon and select the appropriate option:

- Display settings: Allows to view information about your display(s) and display controller. Also allows to select a display function, control display luminance and calibrate display(s)
- Test patterns: Allows to select test patterns to show
- Application settings: Allows to change NioWatch application settings, such as the Equalization option for calibration or MediCal Administrator connection
- Help: Allows to consult the online help
- About: Allows to view information about this version of NioWatch
- Exit: Allows to close NioWatch and remove it from the systray
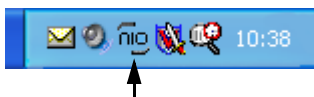
Figure 41: NioWatch systray icon

Note: After installation, a shortcut "NioWatch Client" is installed in the NioWatch installation directory. You can copy this shortcut to another location (e.g., desktop) if desired.
After double-clicking this shortcut, the NioWatch console (see below) appears, allowing you to execute the NioWatch functions.
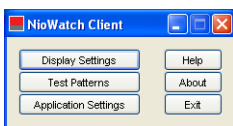
Figure 42

Display settings

General
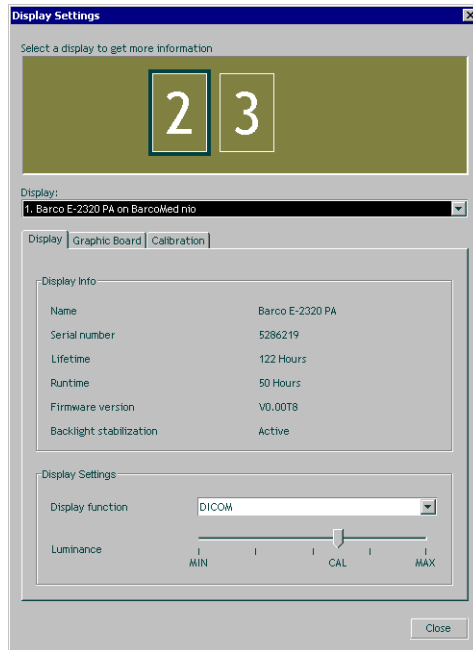
Figure 43: Display Settings dialog

The numbered icons in the upper part of the dialog represent the display controller heads supported by NioWatch.

The display controller heads are also listed in the **Display** drop-down box.

If you wish to control a display in a multi-head system, you must select the display controller head to which the display is connected. You can do this by clicking on the corresponding

numbered icon or by selecting the corresponding display controller head from the **Display** drop-down box.

Tip: If you click on a numbered icon, the corresponding number appears for a few seconds on the display connected to that display controller head. In that way you can easily see which display is connected to which head.

The Display tab allows to view information about the display.

The Graphic board tab allows to view information about the display controller.

The Calibration tab allows to calibrate the display(s) or view the result of the last calibration.

Display tab

- In the **Display Info** section, you can view the name and serial number of the selected display.

  For Nio (E-XX20) displays, you can also view:

- Lifetime: Operation time including time in stand-by
- Runtime: Operation time excluding time in stand-by
- Firmware version: Version of internal display software
- Backlight Stabilization: Status of the backlight stabilization in the display.

- To select another display function, select an item from the **Display Function** drop-down box.

  If the selected display has been calibrated to the selected display function in the past, the display will be set according to this calibration. If no former calibration was found, default factory settings are selected.

  When you restart NioWatch, the last selected display function is automatically selected.

- To adjust display luminance manually, adjust the **Luminance** slider. This function is not available for MFCD/MFGD 1218 displays.

  The luminance setting is saved when the system is shut down.

  If the slider is positioned above the CAL mark, the luminance is in calibrated position, as determined during the latest calibration. If the slider is not above the CAL mark, the luminance is not in calibrated position.

Important

If you want the system to be DICOM compliant, you must select the DICOM display function and calibrate the display. After calibration, the luminance must remain in calibrated position to maintain DICOM compliance.

Display settings

Graphic Board tab

Figure 44: Graphic Board tab

Here you can see information about the installed display controller: Name, serial number, driver version and firmware version.

Calibration tab
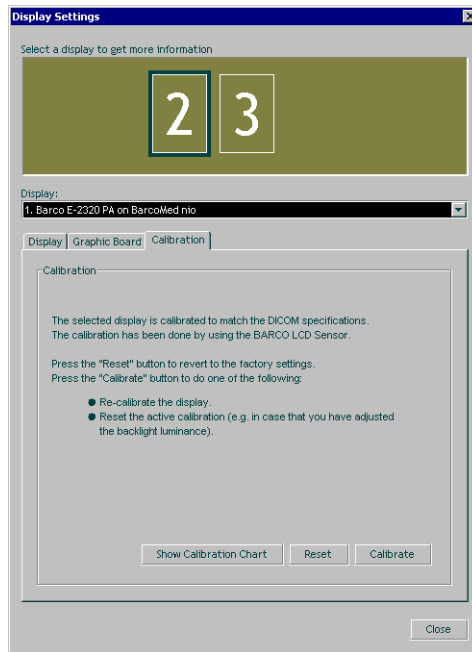
Figure 45: Calibration tab

Here you can calibrate display(s), revert to the latest calibration, revert to default factory settings and view the result of the latest calibration. The possible options are explained below.

To calibrate the display using the Barco LCD sensor:

1. If you have multiple displays of the same type connected (multi-head system), consider if you wish to **equalize** the display you calibrate to a reference display.

Equalization means the luminance of the display you are calibrating will be matched to the luminance of the reference display.

If you wish to equalize the display, you must close the Display Settings dialog and make sure the **Equalization**

option in the **Application Settings** dialog is set. See "Calibration tab" in the description of the Application Settings dialog.

2. If you have multiple displays connected (multi-head system), select the display you wish to calibrate by clicking on the corresponding numbered icon in the Display Settings dialog.

3. Click the **Calibrate** button.

4. A message appears, showing the different calibration options.
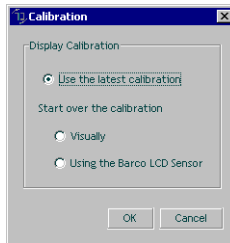
Figure 46: Calibration choices

5. Select "Using the BARCO LCD sensor" and click **OK**.

    This option is grayed in case NioWatch does not find a connected Barco LCD sensor.

6. Follow the guidelines on the screen to complete the calibration successfully.

Note:

If the Equalization option is set in the Application Settings and NioWatch finds at least one other display of the same type that is calibrated, the "Match with reference" page appears during the calibration process.
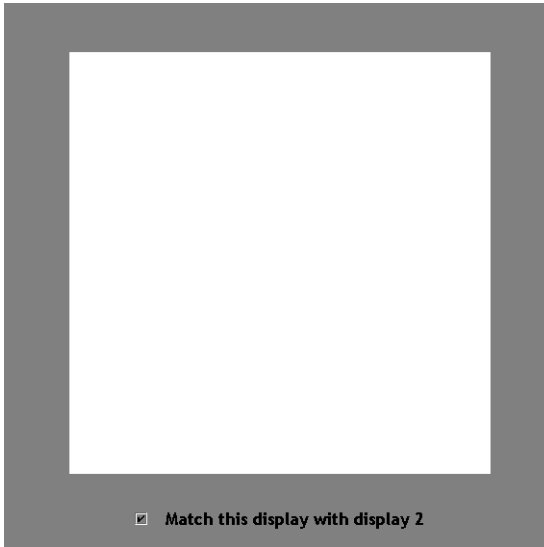
Figure 47: Match with reference

To equalize the display, check the option "Match this display with display...." and click **Next**. The display number that appears in this option, refers to the reference display.

Manual calibration

1. Follow step 2 and 3 of the calibration with Barco LCD sensor (see page 88).

2. In the Calibration dialog (see step no. 4. in the description of the calibration with sensor), check the option **Visually** and click the **OK** button.

The DICOM Optimizer dialog appears.
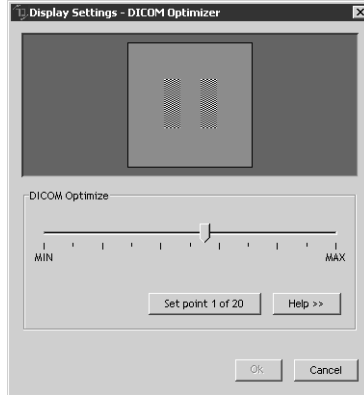
Figure 48: DICOM Optimizer dialog

3. Adjust the slider until there is almost no visible difference between the background of the image above the slider and the bitmap inside this image.

4. When done, click button **Set point 1 of 20**.

5. Repeat this procedure until the button is grayed. This indicates the last point is set.

6. Click **OK** to finish.

To reset to the latest calibration:

1. Follow step 2 and 3 of the calibration with Barco LCD sensor (see page 88).

2. In the Calibration dialog (see step no. 4. in the description of the calibration with sensor), check the option **Use the latest calibration**.

3. Click the **OK** button.

    The calibration and the luminance will be reset to the latest calibrated position.

Note:

When you start up the system, the calibration is also reset to the latest calibrated position. The luminance, however, is kept at the latest value.

To view a graph showing the result of the latest calibration:

1. In the Calibration tab dialog, click on **Show calibration chart**.

    This button is available only if the display has been calibrated with a sensor before.

2. A graph is shown displaying the latest calibration compared to the theoretical display function.

To revert to the default factory settings:

1. In the Calibration tab dialog, click on **Reset**.

2. As a result, the settings are restored to the default factory values.

Test patterns

Test Patterns
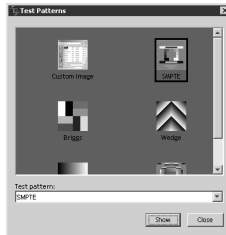
Figure 49: Test Patterns dialog

1. Select the desired test pattern by clicking on the corresponding thumbnail or selecting a pattern by name from the Test pattern drop-down box.

2. Click **Show** to display the pattern.

   If you have selected **Custom Image**, you can select a bitmap image (e.g., saved on the hard disk) as test pattern.

3. To hide the test pattern again, click inside the pattern.

Application settings

Calibration tab
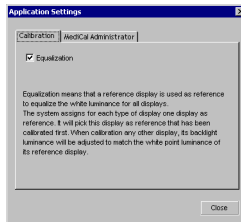
Figure 50: Calibration tab

Here you can check the Equalization option, allowing you to match all the displays from a multi-head system to the luminance of the first calibrated display of the system.

Suppose you work with a system containing 2 displays of the same type, and you wish display (2) to have the same output luminance as display (1). Therefore first calibrate display (1). Next, calibrate display (2) while the Equalization option is checked.

The first calibrated display in the system is the reference display.
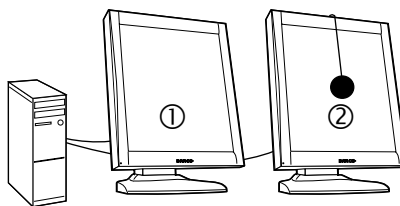
(1) Reference display
(2) Calibrated display: Luminance automatically matched to reference display

Figure 51: Dual-head equalization

The Equalization option will be available only if:

- the system contains at least one display of the same type as the one being calibrated

- at least one of the displays of the same type has already been calibrated before using a sensor.

To equalize the displays:

1. Be sure the reference display is calibrated to the desired luminance.

2. Set the Equalization option in the Application Settings dialog.

3. Close the Application Settings dialog.

4. Open the Display Settings dialog and calibrate display (2).

   The display will be calibrated and additionally the display luminance will be matched to the luminance of the reference display (1).

MediCal Administrator tab
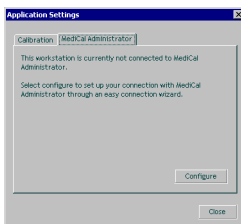
Figure 52: MediCal Administrator tab

Here you can connect to MediCal Administrator, if present.

To connect to MediCal Administrator, click the **MediCal Administrator** button. As a result, the MediCal Administrator connection wizard starts. Please follow the guidelines from the wizard.

The MediCal Administrator software is a hospital-based softcopy image quality management system that keeps the consistency data of every connected display system in a central database. Via

the user-friendly web interface, accessible from any client, users have access to all the information of the installed display base.

For more information about MediCal Administrator, please contact Barco Medical Imaging Systems or consult our web site.

Update NioWatch
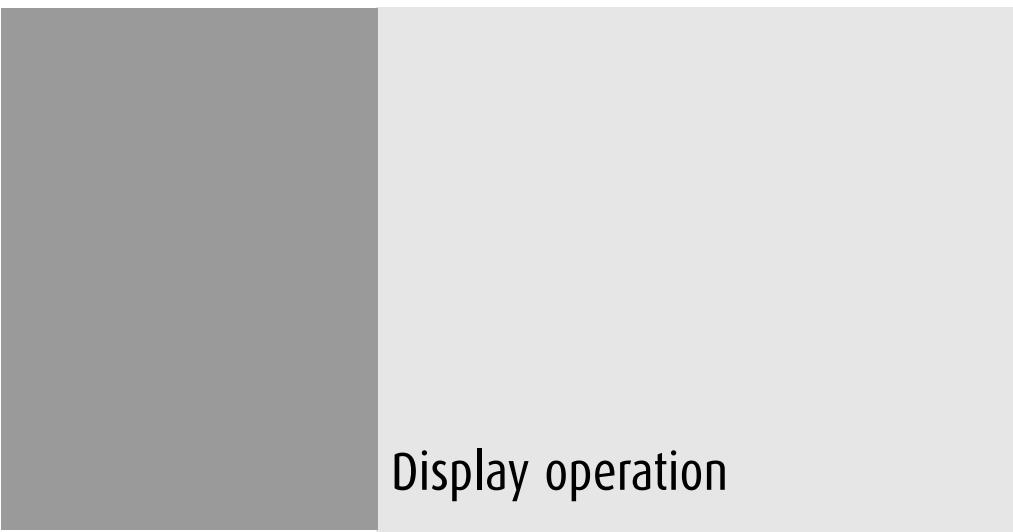
In the Windows Start menu, the Update NioWatch application is installed during installation of NioWatch.

To update NioWatch:

Select **Update NioWatch** from the Start > Programs > Barco NioWatch menu.

The application will search via the Internet if NioWatch updates are available. If so, you will get the option to install them.

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Display operation

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Display operation

🛈 **Operating precautions**

Continuous operation of the display with the same screen may result in some image sticking on the LCD panel.

Over 10 hours operation with the same image content is not recommended.

Switching on the display DPMS may decrease the risk of image sticking (image retention).

Stand-by switching

When the display is on and no on-screen display is visible, push the control wheel at the front for a few seconds to switch the display in stand-by. The LED turns orange.

Push and hold
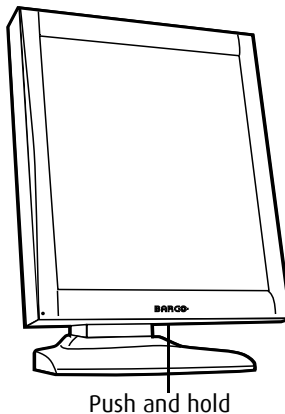
Figure 53

When the display is in stand-by, press the control wheel to switch it back on.

About the On-Screen Display (OSD)

About the on-screen display

The on-screen display (OSD) has a hierarchical tree structure, with several levels. The top level is the "Main Menu".

```
            E-X62X

          MAIN MENU
Luminance
Settings
Information
EXIT
```
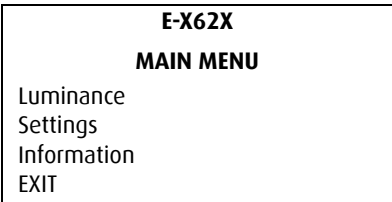
Figure 54: Main menu

How to navigate through the OSD

1. When the OSD is not on the screen, rotate the control wheel to display the OSD.

   The main menu appears.

2. To enter into a menu: First, rotate the control wheel to select the desired menu. Next, press the wheel shortly.

```
            E-X62X

          MAIN MENU
Luminance                    ②
Settings
Information                         SETTINGS
EXIT                         DPMS          On
                             Power LED     On
                             User controls  On
                             EXIT
```
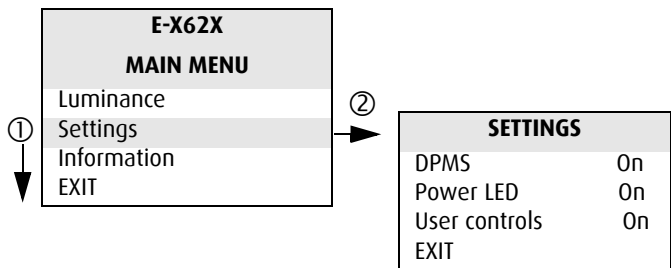
1. Rotate the control wheel

2. Press the control wheel

Figure 55: OSD menu navigation

3. To exit from a menu, rotate the control wheel to select EXIT.

   If you exit from the Main Menu, you exit the OSD.

4. To change an adjustment value (e.g., the luminance value), rotate the control wheel to select the adjustment and press the wheel shortly.

   The adjustment name appears, as well as the current adjustment value. Rotate the wheel to change the value.

   When done, press the wheel shortly to confirm the change and return to the menu.

5. To select a value from a predefined list (e.g., in Settings), rotate the control wheel to select the setting and press the control wheel until the desired value appears.

Locking and unlocking user controls

The User Controls function allows to disable or enable the control wheel functions.

When user controls are disabled, you cannot:

- display and use the on-screen display
- switch the display in stand-by mode

To disable user controls:

1. Rotate the control wheel to display the on-screen display. The Main Menu appears.

2. Rotate the control wheel to select **Settings**.

3. Press the control wheel to enter the Settings menu.

SETTINGS	
DPMS	On
Power LED	On
User Controls	On
EXIT	

Figure 56: Settings menu

4. Rotate the control wheel to select **User Controls**.

5. Press the control wheel to switch from "On" to "Off".

6. Exit the menus.

To enable user controls:

1. Do not use the control wheel for at least 3 seconds.

2. Rotate the control wheel 1 step clockwise.

3. Press the control wheel 2 times.

4. Rotate the control wheel 1 step counterclockwise. The on-screen display appears.

   Note: Steps 2 to 4 must be performed in maximum 3 seconds.

5. Rotate the control wheel to select **Settings**.

6. Press the control wheel to enter the Settings menu.

SETTINGS	
DPMS	On
Power LED	On
User Controls	Off
EXIT	

Figure 57: Settings menu

7. Rotate the control wheel to select **User Controls**.

8. Press the control wheel to switch from "Off" to "On".

9. Exit the menus.

Complete OSD overview

Main menu

Name	Description
Luminance	Adjust the target luminance to which the display will be stabilized.
Settings	Change settings for DPMS, Power LED and User Controls
Information	Read information about the display

Luminance

Name	Description
Luminance Target	Manually adjust the luminance. The luminance is indicated in %.

Luminance adjusts the overall luminance (light output) of the *display*. It does not affect the grayscales of the image on the screen.

Settings

Name	Description
DPMS	Switch on/off the automatic power saving system (DPMS)
Power LED	Switch the power LED on/off. Note: The LED's orange DPMS state is not influenced by this setting. So, when the display goes into power-saving mode, the LED will turn orange, even if it was switched off by this setting.
User Controls	Disable the control wheel functions

Information

Name	Description
Product	The display type
Serial No	Indicates the display serial number
SW Version	Displays the current internal software version
Display Lifetime	Indicates the total time the display has been operating, including the time in stand-by
Backlight Lifetime	Indicates the total time the display has been operating, excluding the time in stand-by

Cleaning

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⚠ **Precautions**

- Take care not to damage or scratch the glass or LCD panel.

- Do not apply pressure on the glass or LCD panel.

- Do not apply or spray liquid directly to the glass, panel or cabinet as excess liquid may cause damage to internal electronics. Instead, apply the liquid to the cleaning cloth.

- DO NOT USE:

    - Lye or cleaning solutions containing lye*

    - Acid

    - Detergents with fluoride

    - Detergents with ammonia

    - Detergents with abrasives

    - Steel wool

    - Sponge with abrasives

    - Cloth with thread made of steel

    - Other coarse tools

*(Lye is a strong caustic alkaline solution of potassium salts.)

Panel

🛈 **Important:**

We recommend to let this cleaning procedure be done in a Barco service center. If not, you must perform the cleaning in a clean and dust-free environment.

1. If there are dust particles on the LCD panel, blow them away by using a dust remover. E.g., DUST OFF 67 (KONTAKT Chemie).

    A dust remover is composed of a blend of compressed liquid gases functioning as propellant. They provide a jet of dry inert gas that acts like compressed air for a quick and safe

removal of dust particles and other dry contaminants on the surface of the lcd panel or the glass panel.

Attention: The dust remover contains a liquid gas. If you shake the can or move the can too fast while spraying, you may blow drops of liquid on the panel surface!

If this is the case, clean the panel as described below.

2. If the LCD panel is dirty or wet, take a lint-free, nonabrasive cloth and lightly moisten the cloth with a solution of 25% Isopropyl Alcohol (IPA) and 75% de-ionized or distilled water. E.g.: Cleareen, a product of Certified Laboratories.

3. Gently clean the panel with the moist cloth.

4. Take another clean, dry, soft, lint-free cloth and gently wipe the glass dry.

Cabinet

· Clean the cabinet using a recognized cleaning product for medical equipment. The cloth you use must be moist, not wet!

· Repeat with water only and wipe dry with a dry cloth.

· The cabinet has been tested for resistance to the following products:

Cidex, Betadine, Alcohol (Isopropyl and Ethyl), Ammonia-based cleaners (Windex) and Aquasonic Gel.

Troubleshooting

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General tips

- If one display from a multi-head system exhibits problems, try to eliminate the problem by switching video cables or power supplies. In that way you can find out if the problem resides in the display or not.

Problems and solutions

Problem description	Possible tests or solutions
Screen remains black	• Please check the installation procedure in this manual • If the LED at the front is orange, the display is in stand-by • Check in the Windows Display Properties if the display controller video heads are attached. If not, there will be no image on the screen. • The external power supply may be defective •
Image exhibits noise or interference	• The video cable may be of poor quality • DVI video cable may not be firmly connected to the PC or to the display
Image contains missing pixels	• A number of missing pixels may be normal (inherent in LCD technology)
Image contains not enough grayscales	• You may have installed the driver software with an inappropriate selection of Palette Settings (Static Gray with or without System Colors). Install the driver software again using a different setting for Palette Settings.
The PC does not start up	• Check the CMOS settings in the PC BIOS • The display controller may not be firmly seated in the PCI / AGP connector

Problem description	Possible tests or solutions
No image during PC start-up	• Check the VGA jumper settings on the display controller • Check the CMOS settings in the PC BIOS
Nothing happens when you press or rotate the control wheel	• The User Controls may be disabled. Please read the paragraph about the "User Controls" function.
The image is non-proportionally spread out over the screen	• Select another resolution in the Windows "Display Properties" control panel
The image on the screen is rotated 90°	• Select another resolution in the Windows "Display Properties" control panel
The previous image remains slightly visible on the screen	• This phenomenon, called "image sticking" is normal if the same image has been on the screen for a long time. The ghost image will disappear after some time. Over 10 hours operation with the same image content is not recommended. Switching on the display DPMS may decrease the risk of image sticking. • A slight case of image sticking can be solved by continuously displaying a full white image during a number of hours.
On a dual-head system, the images on the left and right display seem to be switched	• Switch the video cables at the display controller or at the display video inputs

Windows 2000 display resolution

☞ **Tip:** These instructions apply to both **Windows**® **2000** and **Windows**® **XP**.

① **Important:** If you are using a color display in conjunction with your Barco grayscale display(s) you should configure your desktop before setting the resolution of the your Barco grayscale display(s).

Configuring the Windows 2000 or Windows XP desktop

Under Windows 2000 or Windows XP the recommended configuration for best grayscale image quality when using a color display in conjunction with your high-resolution grayscale display(s) is to set the *color display* as the **primary** monitor. Then set the colors setting on the "Settings" tab of the Windows Display Control Panel to the highest possible color depth (e.g. 32 bits-per-pixel "true color") supported by the color display's controller.

The colors setting for your high-resolution grayscale displays should default to 256 colors (8 bits per pixel). The **palette mode** for the your high-resolution grayscale displays should be set to *Static Gray palette with NO system colors*. This guarantees that the all of the 256 gray levels available for GDI graphics will be present, and also eliminates the danger that colors will change when focus moves among different applications.

However, if you are using the *Color to Gray Compatibility* palette mode, the color setting for your high-resolution grayscale displays should default to True Color (32 bits per pixel). Even though this palette mode supports 32 bit True Color, we recommend that when using a using a color display in conjunction with your high-resolution grayscale display(s) that you still set the *color display* as the **primary** monitor.

Setting the resolution of your BARCOMED NIO display

In order to set the resolution of your BARCOMED NIO display you must be logged in using an account with administrator privileges.

1. To set the resolution of your BarcoMed Nio display(s) right click on the **desktop** and select **"Properties"**.

2. Select the **"Settings"** tab.

3. Select the **rectangle** that represents the first BARCOMED NIO display attached to the BarcoMed Nio display controller you are working with.

   NOTE: If you are using the VGA capabilities of your BarcoMed Nio display controller, the resolution for the first display may be set to a VGA resolution of "640 x 480" pixels with 16 colors and a default refresh rate. If your BarcoMed Nio controller is not running VGA, the display may not be enabled yet. To enable the display, check the "Extend my Windows desktop onto this monitor" **checkbox**, but do **NOT** click the **"Apply"** button at this time.

   If you installed your BarcoMed Nio drivers in *SingleView* mode (default for Windows 2000) there will be one rectangle for the virtual display representing the two heads controlled by each BarcoMed Nio display controller.

   If you installed your BarcoMed Nio drivers in *DualView* mode (default for Windows XP) there will be a rectangle representing each head controlled by each BarcoMed Nio display controller. This will be true even if you have only one display connected to your BarcoMed Nio controller. Both displays of a display controller cannot be enabled at the same time unless their display properties match. If necessary detach the second display of the BarcoMed Nio display controller you are working with by right clicking on the **rectangle** that represents it, deselect **"Attached"** and click the **"Apply"** button.

   Tip: Since Windows 2000 and Windows XP will not let you detach the primary display connected to a particular

controller, you may need to temporarily make another display the primary display

Caution: if you have a single display configuration and you have enabled DualView, Windows will not allow you to attach the second head. This is normal and not a bug.

4. For the display which is still attached click on the **"Advanced"** Button.

5. Select the **"Adapter"** tab and then click on the **"List All Modes"** button. Select the resolution and refresh rate that your BarcoMed Nio display supports from the dialog box and click **"OK"**.

Tip: In the Adapter box, the Adapter string shows if this display is the First View or the Second View attached to the display controller. Please make a note of this, so that you can arrange the displays in the correct order later if necessary.

6. Click **"OK"** on the bottom of the Adapter Control Panel. If the "OK" button on the bottom of the Adapter Control Panel is not visible, press the **"TAB"** key once and then press **"CTRL"+"Enter"** to select "OK".

7. Click **"OK"** in the "Windows will now apply your new desktop settings" dialog box. Your BarcoMed Nio display should now synchronize and display the Windows desktop.

8. Click **"Yes"** when asked, "Your desktop has been reconfigured. Do you want to keep these settings?"

To set the resolution of the second display attached to the BarcoMed display controller you are working with, go back to the "Settings" tab of the "Display Properties Control Panel". Attach

the display you detached in step 2 above, by right clicking on the rectangle that represents it and selecting **"Attached"**.

Now repeat steps 5-8 above for this display.

If you are using a Quad-Head Configuration repeat all of the above steps for the two displays on the second display controller.

☞ **Tip:** After installing DualView and setting the resolutions in a Quad-Head Configuration you may need to drag the heads into the proper position in the window on the "Settings" tab, so that the arrangement in the window on the "Settings" tab matches the physical arrangement of your configuration.
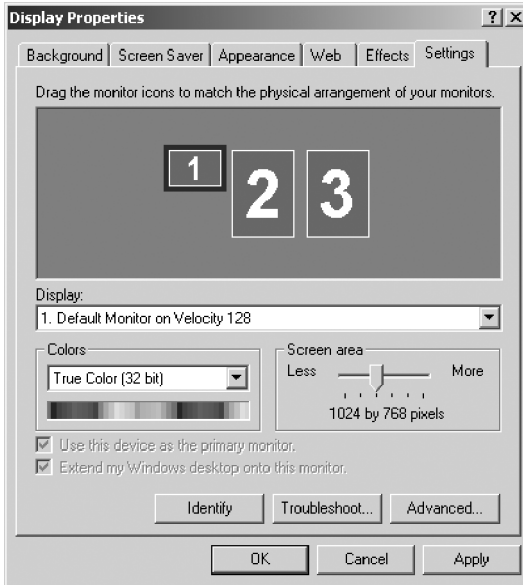
Figure 58: The Windows Display Properties Control Panel Settings Tab after the drivers have been installed and the resolution set with DualView Enabled.

Note: The system shown in figure 58 above is a dual-head, single BarcoMed Nio display controller, with a 3rd party VGA controller configuration. Your system may look different.

Driver re-installation, updates or removal

Reinstalling or updating your BarcoMed Nio driver

Note: These instructions apply to Windows 2000 and Windows XP.

Important for Windows 2000 or Windows XP users only: If you previously uninstalled the driver, do **not** allow the Windows Plug and Play software to reinstall the driver for you.

To reinstall or update only the BarcoMed Nio driver, follow the steps described in the section **"Using the BarcoMed Product Installation Wizard"** with the following changes.

1. Boot your system, and log in using an account with administrator privileges.

2. Insert your BARCOMED NIO Software CD into your computer's CD drive. If the **"BarcoMed Product Installation Wizard"** doesn't start within one minute, browse the contents of your BARCOMED NIO Software CD and double click on the file: **"Setup.exe"** to start the wizard.

    The wizard will begin by displaying the screen shown in figure 59 below.
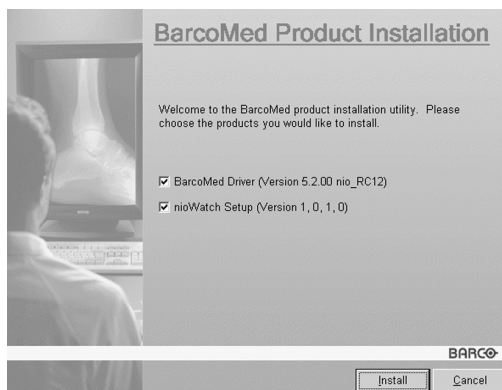
Figure 59

3. To update the driver, clear the checkbox next to **"NioWatch Setup" (**figure 60) and click **"Install"**.
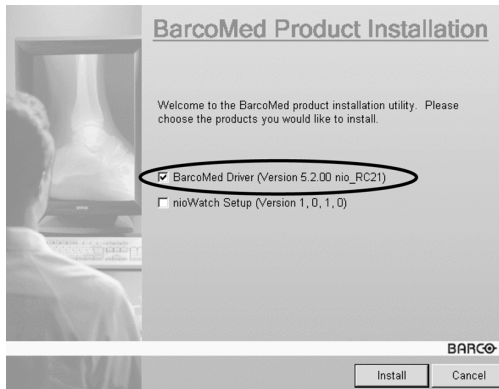
Figure 60

4. For **Windows 2000** or **Windows XP** please turn to Step 6 on page 4 in the section titled **"Windows 2000 BarcoMed Nio software installation"** and follow the instructions to finish reinstalling or updating your BarcoMed Nio driver.

When the driver has finished installing, click **"Finish"**. Then click **"Finish"** again.

Reboot the system when prompted and then reset the resolution of your displays if necessary.

Uninstalling the BarcoMed Nio driver or Barco NioWatch software

Special Note: The BarcoMed Uninstaller is supported only on Windows 2000 and Windows XP.

To remove the BarcoMed Nio display controller driver from your system you must be logged in using an account with administrator privileges.

Uninstalling the BarcoMed Nio driver

1. Insert your BarcoMed Nio Software CD into your computer's CD drive. If the **"BarcoMed Product Installation Wizard"**

doesn't start within one minute, browse the contents of your BarcoMed Nio Software CD and double click on the file: **"Setup.exe"** to start the wizard.

2. The BarcoMed Product Installation Wizard will display its welcome screen.

3. Make certain that the checkbox next to the driver is checked and that all other checkboxes are unchecked (figure 61 below). Click **"Install"** to continue.
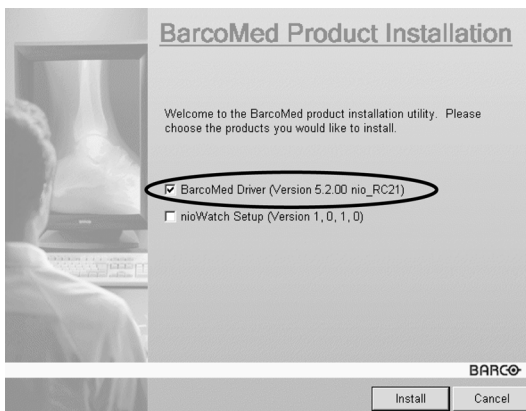
Figure 61

4. Click **"Next"**.

5. On the next screen (see figure 62 on page 123), **check** the checkbox next to "Uninstall this device" and click **"Next"** to continue.
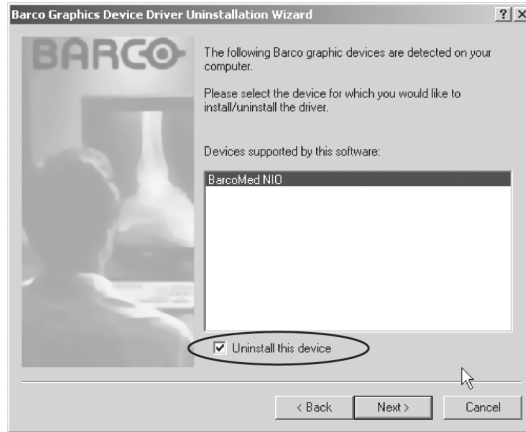
Figure 62

6. Click **"Next"**.

7. If you installed your driver with DualView <u>enabled</u>, skip to step 8.

    If you installed your driver with DualView <u>disabled</u>, click **"Next"** to continue. Then click **"Finish"** to complete the uninstall process. Click **"Finish"** again to exit the wizard. Click **"Yes"** if Windows tells you that "you must restart your computer before the new setting will take effect".

8. If you have installed your driver in DualView mode the wizard will warn you that you must first disable DualView by rebooting and then run the uninstall program again.

Figure 63

    Click **"OK"** to continue.

9. Click **"Reboot"** to disable DualView, click **"Finish"** to exit the wizard and then click **"Yes"** to reboot your system.

10. When your system restarts, log in again using an account with administrator priveleges. DualView should now be disabled.

11. The **"BarcoMed Product Installation Wizard"** should automatically restart. Finish uninstalling the driver by clicking **"Next"** three times. Then click **"Reboot", "Finish"** and **"Yes"**.

If the **"BarcoMed Product Installation Wizard"** doesn't automatically restart, finish uninstalling the driver by restarting the **"BarcoMed Product Installation Wizard"** by browsing the contents of your BarcoMed Nio Software CD and double clicking on the file: **"Setup.exe"**. Then follow Step 3 on page 122 through Step 7 on page 123 to finish uninstalling the driver.

Technical Information

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Technical specifications

E- 2620:

Item	Specification
Picture panel	19.6-inch diagonal viewable screen TFT (thin film transistor) active matrix, gray-scale liquid crystal display
Resolution	Native: 1600 x 1200
Display area (H x V)	398.4 x 298.8 (mm)
Viewing angle (@ 10/1 contrast)	Vertical: 170º Horizontal: 170º
Pixel Pitch	0.249 mm (H) x 0.249 mm (V)
Native color resolution	8 bits / sub-pixel
Luminance	500 cd/m² (calibrated)
Contrast ratio	850/1 (on/off in dark environment)
Response time	20 ms typical (@ 25° C after 30 min warm-up)
Controls	Push / turn control wheel for stand-by switching and OSD controls
Input connectors	DVI dual channel
Signal systems	Video on DVI: Complying to DVI Rev 1.0 specifications Sync on DVI: Complying to DVI Rev 1.0 specifications
Input signals	Possible resolutions: · 640 x 480 @ 60, 75, 85, 100 Hz · 1600 x 1200 @ 59, 60 Hz · 1200 x 1600 @ 59 Hz
USB standard supported	USB 1.1

Item	Specification
Power source	Input for 12 VDC power supply unit: 90 ~ 264 VAC Input for display: 12 VDC. (The supplied 12VDC power supply must be used)
Power consumption	66 watts (max., at 90 VAC, maximum backlight, USB load)
Dimensions (W x H x D)	In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°: 385 x 585 x 250 mm
Net weight	14 kg
Operating Temperature	Operation: 0°C to 40°C Within specs: 15°C to 35°C
Storage Temperature	-20°C to 60°C
Humidity	8% - 80% (non-condensing) for operation 5% - 95% (non-condensing) for storage
Altitude	7500 m storage 3000 m operation

E- 2620 (S):

Item	Specification
Picture panel	20.1-inch diagonal viewable screen TFT (thin film transistor) active matrix, gray-scale liquid crystal display
Resolution	Native: 1600 x 1200
Display area (H x V)	408 x 306 (mm)
Viewing angle (@ 10/1 contrast)	Vertical: 170º Horizontal: 170º
Pixel Pitch	0.255 mm (H) x 0.255 mm (V)
Native color resolution	8 bits / sub-pixel
Luminance	400 cd/m² (calibrated)
Contrast ratio	1000/1 (on/off in dark environment)
Response time	12.5 ms typical (@ 25° C after 30 min warm-up)
Controls	Push / turn control wheel for stand-by switching and OSD controls
Input connectors	DVI dual channel
Signal systems	Video on DVI: Complying to DVI Rev 1.0 specifications Sync on DVI: Complying to DVI Rev 1.0 specifications

Item	Specification
Input signals	Possible resolutions: · 640 x 480 @ 60, 75, 85, 100 Hz · 800 x 600 @ 60, 75, 85, 100 Hz · 1024 x 768 @ 60, 75, 85, 100 Hz · 1152 x 864 @ 75 Hz · 1152 x 870 @ 60, 85, 100 Hz · 1024 x 1280 @ 59, 70 Hz · 1280 x 1024 @ 60, 75, 85 Hz · 1600 x 1200 @ 59, 60 Hz · 1200 x 1600 @ 59 Hz
USB standard supported	USB 1.1
Power source	Input for 12 VDC power supply unit: 90 ~ 264 VAC Input for display: 12 VDC. (The supplied 12VDC power supply must be used)
Power consumption	66 watts (max., at 90 VAC, maximum backlight, USB load)
Dimensions (W x H x D)	In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°: 385 x 585 x 250 mm
Net weight	14 kg
Operating Temperature	Operation: 0°C to 40°C Within specs: 15°C to 35°C
Storage Temperature	-20°C to 60°C
Humidity	8% - 80% (non-condensing) for operation 5% - 95% (non-condensing) for storage
Altitude	7500 m storage 3000 m operation

E‑ 2621:

Item	Specification
Picture panel	21.3-inch diagonal viewable screen TFT (thin film transistor) active matrix, gray-scale liquid crystal display
Resolution	Native: 1600 x 1200
Display area (H x V)	432.0 x 324.0 (mm)
Viewing angle (@ 10/1 contrast)	Vertical: 170º Horizontal: 170º
Pixel Pitch	0.27 mm (H) x 0.27 mm (V)
Native color resolution	8 bits / sub-pixel
Luminance	500 cd/m² (calibrated)
Contrast ratio	700/1 (on/off in dark environment)
Response time	17.5 ms typical (@ 25° C after 30 min warm-up)
Controls	Push / turn control wheel for stand-by switching and OSD controls
Input connectors	DVI dual channel
Signal systems	Video on DVI: Complying to DVI Rev 1.0 specifications Sync on DVI: Complying to DVI Rev 1.0 specifications
Input signals	Possible resolutions: · 640 x 480 @ 60, 75, 85, 100 Hz · 1600 x 1200 @ 59, 60 Hz · 1200 x 1600 @ 59 Hz
USB standard supported	USB 1.1

Item	Specification
Power source	Input for 12 VDC power supply unit: 90 ~ 264 VAC Input for display: 12 VDC. (The supplied 12VDC power supply must be used)
Power consumption	66 watts (max., at 90 VAC, maximum backlight, USB load)
Dimensions (W x H x D)	In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°: 385 x 585 x 250 mm
Net weight	14 kg
Operating Temperature	Operation: 0°C to 40°C Within specs: 15°C to 35°C
Storage Temperature	-20°C to 60°C
Humidity	8% - 80% (non-condensing) for operation 5% - 95% (non-condensing) for storage
Altitude	7500 m storage 3000 m operation

E-3620:

Item	Specification
Picture panel	20.8-inch TFT AM-LCD IPS dual domain
Resolution	Native: 2048 x 1536
Display area (H x V)	423.9 x 318 (mm)
Viewing angle (@ 10/1 contrast)	Vertical: 170º Horizontal: 170º
Pixel Pitch	0.207 mm (H) x 0.207 mm (V)
Native color resolution	8 bits / sub-pixel
Luminance	500 cd/m² (calibrated)
Contrast ratio	900/1 (on/off in dark environment)
Response time	25 ms typical (@ 25° C after 30 min warm-up)
Controls	Push / turn control wheel for stand-by switching and OSD controls
Input connectors	DVI dual channel
Signal systems	Video on DVI: Complying to DVI Rev 1.0 specifications Sync on DVI: Complying to DVI Rev 1.0 specifications
USB standard supported	USB 1.1
Power source	Input for 12 VDC power supply unit: 90 ~ 264 VAC Input for display: 12 VDC. (The supplied 12VDC power supply must be used)
Power consumption	79 watts (max., at 90 VAC, maximum backlight, USB load)

Item	Specification
Dimensions (W x H x D)	In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°: 385 x 585 x 250 mm
Net weight	13 kg
Operating Temperature	0°C to 40°C, 15°C to 35°C within specs
Storage Temperature	-20°C to 60°C
Humidity	8% - 80% (non-condensing) for operation 5% - 95% (non-condensing) for storage

E-3621:

Item	Specification
Picture panel	21.3-inch TFT AM-LCD IPS dual domain
Resolution	Native: 2048 x 1536
Display area (H x V)	433.2 x 324.9 (mm)
Viewing angle (@ 10/1 contrast)	Vertical: 170º Horizontal: 170º
Pixel Pitch	0.2115 mm (H) x 0.2115 mm (V)
Native color resolution	8 bits / sub-pixel
Luminance	500 cd/m² (calibrated)
Contrast ratio	700/1 (on/off in dark environment)
Response time	17.5 ms typical (@ 25° C after 30 min warm-up)
Controls	Push / turn control wheel for stand-by switching and OSD controls
Input connectors	DVI dual channel
Signal systems	Video on DVI: Complying to DVI Rev 1.0 specifications Sync on DVI: Complying to DVI Rev 1.0 specifications
USB standard supported	USB 1.1
Power source	Input for 12 VDC power supply unit: 90 ~ 264 VAC Input for display: 12 VDC. (The supplied 12VDC power supply must be used)
Power consumption	66 watts (max., at 90 VAC, maximum backlight, USB load)

Item	Specification
Dimensions (W x H x D)	In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°: 385 x 585 x 250 mm
Net weight	14 kg
Operating Temperature	0°C to 40°C, 15°C to 35°C within specs
Storage Temperature	-20°C to 60°C
Humidity	8% - 80% (non-condensing) for operation 5% - 95% (non-condensing) for storage

E-5620:

Item	Specification
Picture panel	20.1-inch Advanded-SFT
Resolution	Native: 2560 x 2048
Display area (H x V)	399.36 x 319.49 (mm)
Viewing angle (@ 10/1 contrast)	Vertical: 85° Horizontal: 85°
Pixel Pitch	0.156 mm (H) x 0.156 mm (V)
Native color resolution	8 bits / sub-pixel
Luminance	500 cd/m² (calibrated)
Contrast ratio	600/1 (on/off in dark environment)
Response time	15 ms typical (@ 25° C after 30 min warm-up)
Controls	Push / turn control wheel for stand-by switching and OSD controls
Input connectors	DVI dual channel

Item	Specification
Signal systems	Video on DVI: Complying to DVI Rev 1.0 specifications Sync on DVI: Complying to DVI Rev 1.0 specifications
USB standard supported	USB 1.1
Power source	Input for 12 VDC power supply unit: 90 ~ 264 VAC Input for display: 12 VDC. (The supplied 12VDC power supply must be used)
Power consumption	80 watts (max., at 90 VAC, maximum backlight, USB load)
Dimensions (W x H x D)	In perpendicular vertical position, highest position, tilt = 0°, swivel = 0°: 385 x 589 x 250 mm
Net weight	11.1 kg
Operating Temperature	0°C to 40°C, 15°C to 35°C within specs
Storage Temperature	-20°C to 60°C
Humidity	8% - 80% (non-condensing) for operation 5% - 95% (non-condensing) for storage

Connector pin assignments

DVI connector:
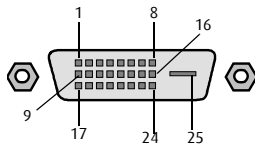
Figure 64: DVI connector pin layout

Pin no.	Signal	Pin no.	Signal
1	TMDS DATA 2-	14	+5V POWER
2	TMDS DATA 2+	15	GND
3	GND	16	HOT PLUG DETECT
4	NC	17	TMDS DATA 0-
5	NC	18	TMDS DATA 0+
6	DDC CLOCK	19	GND
7	DDC DATA	20	NC
8	NC	21	NC
9	TMDS DATA 1-	22	GND
10	TMDS DATA 1+	23	TMDS CLOCK-
11	GND	24	TMDS CLOCK+
12	NC	25	GND
13	NC		

Glossary

Calibration

Each display is calibrated in the factory before it is sent to the customer. After this calibration, black and white luminance are set to the ideal level.

A stabilization routine, constantly active when the display is on, keeps these levels constant using the built-in sensor.

Display Controller head

A display controller (graphics board) converts the digital data from the computer into digital or analog video voltages.

Most of the common display controllers contain just one set of video and sync outputs. However, some high-end boards, like some of the BarcoMed boards, contain two sets of video and sync outputs. This is called a dual head display controller. It is like two complete display controllers implemented on one single unit.

A dual head board in the computer behaves exactly as if two separate boards were installed.

DICOM

DICOM stands for Digital Imaging and Communications in Medicine. It is a standard developed by the American College of Radiology (ACR) and the National Electrical Manufacturers Association (NEMA).

The standard specifies how digital image data can be moved from system to system.

In addition, Supplement 28 Part 14 specifies a function that relates pixel values to displayed Luminance levels and is called Grayscale Standard Display Function.

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Warranty Statement

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ARTICLE 1: SERVICES

BarcoView warrants that the equipment will be free of defects in workmanship or material for the warranty period.

Notwithstanding the provisions of clause 2, repair and replacement of defects in material and/or workmanship under this warranty shall be accomplished in our works in the following manner:

1.1 The Customer, upon the occurrence of any equipment failure, shall contact BarcoView Customer Support Center (or an authorized service center) by telephone, fax or e-mail and shall provide the applicable Customer Support person with a complete description of the problem being encountered, including the model and serial number of the equipment in which the problem has arisen.

1.2 The Customer Support person shall diagnose the problem experienced by the Customer and shall advise the Customer on how to proceed. Customer Support may ask to return the faulty equipment or faulty subassemblies to the BarcoView Customer Support Center (or an authorized service center) for repair activities. The Customer shall ask for a RMA or RAN number to a BarcoView Customer Support Center (or an authorized service center).

1.3 The Customer shall return, freight prepaid, the defective equipment or subassemblies for repair to the BarcoView Customer Support Center (or an authorized service center).

1.4 Replacement parts used shall be new or equivalent to new parts for the revision level of the equipment. The warranty period for the replacement parts will expire at the same moment as the original warranty period of the equipment. All parts replaced hereunder and returned to BarcoView (or an authorized service center) shall become the property of BarcoView (or the authorized service center).

1.5 The repaired equipment shall be returned to the Customer, by regular freight, at BarcoView's charge.

ARTICLE 2: ITEMS EXCLUDED FROM WARRANTY

The warranty described herein shall not include the following:

2.1 Any hardware or software item procured from a source other than BarcoView or their official agent or distributor and integrated by Customer or a third party into BarcoView supplied equipment.

2.2 Any host configuration not explicitly supported by BarcoView.

2.3 All software installed on the system, whether they are acquired from BarcoView or third party. An exception is made for software delivered by BarcoView that would prove to be a cause for the malfunctioning of the hardware covered under this Agreement.

2.4 Normal wear and tear, use under circumstances exceeding specifications, abuse, unauthorized repair or alternation, lack of proper maintenance.

2.5 Any failures resulting from an accident, negligence (such as but not limited to removing or deleting system files & licensed software product files), misuse, circuit failure or any change, damage due to fire, water, thunder or lightning, power failure or fluctuation, disruption of communication lines or due to force majeure, or any reason foreign to the equipment.

2.6 Any specific services or procedures, asked for by Customer, related to verification of repaired equipment.

ARTICLE 3: OBLIGATIONS OF THE CUSTOMER

Customer hereby assumes the following obligations as partial consideration for BarcoView performance of its requirements under the warranty condition; failure by Customer to meet its

obligations under this paragraph shall excuse BarcoView's performance hereunder:

3.1 Customer shall not expose BarcoView personnel to any unsafe working conditions.

3.2 Repairs to equipment under warranty resulting from improper maintenance or repair performed by the Customer, or its officers, agents, employees, or representatives, shall be borne by the Customer at its additional cost and expense.

3.3 The customer is responsible for installing the BarcoView equipment in an environment for which it was intended. If there is an indication that the equipment was used - even temporary - outside its specifications, BarcoView is entitled not to perform warranty repairs and terminate the warranty agreement. Any actions that have been taken by BarcoView in this respect, may be invoiced to the Customer at normal pricing.

ARTICLE 4: MODIFICATIONS OR CHANGES TO THE EQUIPMENT

Customer may make additions to the equipment only with explicit written consent of BarcoView.

Any attempt to do so, voids the warranty.

ARTICLE 5: DISCLAIMER OF WARRANTIES

Barcoview disclaims all warranties, expressed or implied, including all implied warranties of merchantability and fitness for a particular purpose.

ARTICLE 6: LIMITATION OF LIABILITY

Barcoview shall not under any circumstances be liable to customer or any third party for direct, indirect, incidental, special or consequential damages, such as but not limited to, damage to or loss of tangible or intangible property or equipment, loss of profits or revenues, cost of capital, cost of purchase of replacement goods, or claims of customers of user for service interruptions. The liability of BarcoView for manufacturing, sale, delivery, resale, installation, operation or suitability for use of any

products or services covered by or furnished under this warranty condition, whether arising out of contract, negligence, strict tort, warranty or otherwise, shall not exceed the price of the item or items of goods or services upon which such liability is based.

ARTICLE 7: FORCE MAJEURE

Either party shall be released from performance of its obligations under this agreement to the extent, and for so long as, the performance of this agreement is impeded by reason of force majeure. For the purposes of this clause the expression "force majeure" means, but shall not be limited to, industrial dispute, fire, mobilization, requisition, embargo, currency transfer prohibitions, insurrection, lack of means of transport, restrictions of the use of energy, and generally any circumstances which are beyond the control of the parties and hinder performance by one party of his obligations.

ARTICLE 8: GENERAL

8.1 Customer acknowledges its understanding that all software and electronic devices, including BarcoView products are subject to possible error, mechanical or electrical failure, and should not be relied upon in inappropriate applications or without proper backup and/or other safety precautions whenever personal injury or property damage may result from failure or error of the product.

8.2 BarcoView shall not be responsible for machine failure and/ or its failure to render service or maintenance due to causes beyond its reasonable control.